Technical Report 1040

Antecedent Predictors of a "Full Range" of Leadership and Management Styles

Bruce J. Avolio, Shelly Dionne, Leanne Atwater, Alan Lau, John Camobreco, Neil Whitmore, and Bernard Bass
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This report examines relationships between the leadership of entering leaders and antecedent measures of personality, ability, temperament, interpersonal style, experience, and physical fitness. The data described a sample of cadets/students during their first 2 1/2 years of education and military training at a state military college. The primary purpose was to track longitudinally leader development and emergence and, in this reporting of the data, to identify antecedents which differentiate cadets characterized by a transformational leadership style from those cadets more characterized by transactional styles of leadership. Results suggested potential discriminators, but more definitive trends will possibly appear as the cadets progress in education and transition into positions with greater leadership discretion..

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Leader Development Research Unit
Trueman R. Tremble, Jr., Chief

The Center for Leadership and Organizations Research (CLOR), jointly established by the U.S. Military Academy (USMA) and the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI), conducts programmatic research on Army-wide priorities in the areas of organizational leadership and leader education, training, and development. The CLOR's major research effort is known as Leadership Education and Development for the 21st Century (LEAD 21). The overall goal of LEAD 21 is development of a longitudinal database as a capability for understanding the leadership development process. LEAD 21 involves the creation of a longitudinal database, begun with the USMA cadets in the class of 1998, which will allow description of changes in leadership behavior with organizational progression, as well as identification of experiences contributing to progressive leader development.

Important to this and other leader development research are effective methods for measuring, over time and experience, leadership behavior and behavioral change. The research described in this report concerns a form of leadership which likely becomes increasingly applicable over levels of organizational leadership. This form of leadership is "transformational leadership." The expectation is that compared to more conventional transactional forms of leadership, transformational leadership orients followers on goals transcending immediate self-interest and inspires them toward greater organizational effort.

The overall purpose of the reported research is to determine the relationship between transformational leadership behavior and the emergence of leaders and their effectiveness in students attending a military undergraduate college and receiving training for active military service. The present report sought to identify individual characteristics which differentiated students who, as leaders in their first 2 years of college, varied in tendency to display transformational versus transactional leadership behavior. The results generally provide a basis for identifying individual characteristics for predicting leadership potential and the emergence of transformational leadership behavior as individuals have opportunities for roles with greater leadership discretion. The findings also indicate the appropriateness of including transformational leadership in the CLOR's longitudinal database on leader development.

ZITA M. SIMUTIS
Deputy Director
(Science and Technology)

EDGAR M. JOHNSON
Director

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ANTECEDENT PREDICTORS OF A "FULL RANGE" OF LEADERSHIP AND MANAGEMENT STYLES

EXECUTIVE SUMMARY

Research Requirement:

This report provides the results of research examining the relationship between antecedent measures of focal cadet personality, ability, temperament, interpersonal style, experience, and physical fitness with ratings of leadership collected from multiple sources (subordinate and superior) over two time periods. The primary purpose of the research reported here is to assess the characteristics that differentiate focal cadets rated as transformational versus those who are rated as exhibiting less active and/or passive corrective styles of leadership and management.

Transformational leadership behavior has potential payoffs in greater contribution by followers to their unit's missions. This research investigates the development of transformational leadership in entering leaders, with a focus on patterns of leadership development and the antecedent characteristics associated with the growth of styles of leadership. Better understanding of antecedent attributes which differentiate the emergence of leadership styles can provide a basis for intervening to develop individuals and, in turn, for improving the impact of their leadership on the development of their followers.

Procedure:

Data were collected on site at the Virginia Military Institute (VMI) spanning a 2 1/2-year period of time. Antecedent measures of personality, temperament, and experience were collected from each focal cadet upon entry into VMI. Measures such as self-esteem, hardiness, and physical fitness were collected at multiple points in time across the 2 1/2-year period. A multi-source/multi-method strategy was employed in this longitudinal study to measure leadership behavior and its emergence across the focal cadet population. Methods of data collection used for this report involved the completion of surveys of management and leadership style/behaviors. Relationships between antecedent measures of individual differences and leadership and management style behavior were examined in this report using simple bivariate methods of correlation, mean difference tests, hierarchical regression analysis, and LISREL causal modeling routines. The causal model was developed based on theoretical predictions and prior research reviewed in the current report, as well as in earlier reports (see Atwater, Lau, Bass, Avolio, Camobreco, & Whitmore, 1994; Lau, Atwater, Avolio, & Bass, 1993).

Findings:

All measures used to assess individual differences across the focal cadet population had acceptable levels of internal consistency reliability. Similar to prior research, the magnitude of relationships between these antecedent measures and leadership ratings (subordinate and superior) were generally modest to low, suggesting that there were other factors that accounted for differences in leadership ratings obtained about the focal cadets in the current study. The pattern of findings were generally consistent for both superior and subordinate leadership ratings collected at two different time periods. One notable exception with prior research was the negative instead of the expected positive relationship between measures of cognitive ability and the transformational leadership ratings (superior and subordinate). However, consistent with our prior expectations, positive relationships were found between physical fitness, hardiness, moral reasoning and the transformational leadership criteria. Mean-test comparisons for high- versus low-rated focal cadet leaders on the range of leadership and management styles surveyed revealed a number of differences that were consistent with earlier literature. For example, focal cadet leaders rated by subordinates as more transformational, while also using less laissez faire style leadership, had higher scores on several measures of hardiness, physical fitness, self-esteem, conscientiousness, moral reasoning, and prior leadership influence experiences. Finally, preliminary results on changes in perceived leadership style over time were reported with respect to differences in antecedent measures. For example, those focal cadets showing mean increases in subordinate transformational leadership ratings exhibited higher levels of hardiness and self-esteem. For superior ratings these findings were replicated for the hardiness measure.

Utilization of Findings:

As part of a larger longitudinal study, a considerable amount of data has now been collected to assess individual differences in focal cadets at multiple points in time. Although a number of significant relationships were observed in the current study, the absence of several expected relationships may be partially due to the timing of the collection of leadership ratings. Specifically, the target focal cadets in the current study were typically in more informal leadership roles the first 2 1/2 years at VMI; whereas, during their third year at VMI, as well as into their fourth, these focal cadets assume more formal leadership positions at VMI. The assumption of these more formal leadership roles provides these focal cadets with a broader range of opportunities to exhibit leadership, thus allowing them to exercise leadership on a more frequent basis. Hence, the relationships with the antecedent measures discussed in this report may underestimate the true validity of these measures for predicting those cadets who will eventually emerge as leaders within the VMI setting.

The findings from the current investigation provide a basis for further examination of individual characteristics for predicting leadership behavior and potential. These include focusing on characteristics such as energy level, self-concept, cognitive ability and moral development.

ANTECEDENT PREDICTORS OF A "FULL RANGE" OF LEADERSHIP AND
MANAGEMENT STYLES

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INTRODUCTION

The purpose of the present study is to examine antecedent factors that can differentiate those leaders rated as transformational versus other styles of leadership and management, including transactional, nontransactional, contingent and noncontingent punishment. By deepening our understanding of the antecedent characteristics that differentiate those focal cadets seen as transformational leaders from those who are not, we can eventually improve the developmental experiences of military and civilian leaders via selection and training, and in turn, improve the impact these leaders have on the development of their respective followers.

The current research report builds on earlier work reported by Lau, Atwater, Avolio and Bass (1993) and Atwater, Lau, Bass, Avolio, Camobreco and Whitmore (1994), and is part of the longitudinal research project that is being undertaken at the Virginia Military Institute (VMI). In the current report we examine early predictors of leadership and management style, testing a preliminary causal model for predicting transformational versus inactive laissez-faire leadership ratings. Student leaders (cadet leaders) involved in the current study are referred to throughout this report as "focal cadets".

Pertinent leadership research supporting the inclusion of various antecedent measures in the current research project is reviewed. A more comprehensive review of the background leadership literature and empirical support for the choice of measures included in the preliminary causal model tested in this report can be found in Lau, et al. (1993) and Atwater, et al. (1994).

ANTECEDENT MEASURES FOR PREDICTING LEADERSHIP

The model presented in Figure 1 includes individual characteristics which have been shown in previous research to be related to leadership in general, and more specifically, to subordinate ratings of transformational leadership. The model presented in Figure 1 specifies the expected direction of impact on leadership ratings, as well as the time sequencing of data collection. For example, data pertaining to measures of self-esteem and hardiness were collected at multiple points in time over a two and a half-year period, and are appropriately depicted in the model according to the time period when these measures were collected. Similarly, data regarding certain life experiences appear at the far left-hand portion of the model because such life events were obtained at the very outset of the current longitudinal study, and therefore, occurred at earlier points in the focal cadet's life-span. These indicators of early life experience and corresponding measures represent more "distal" antecedent experiences, which could directly affect the development of focal cadets' leadership potential and subsequent leadership ratings. Direct relationships between these distal antecedent events and leadership ratings will be tested as part of the overall causal model. Then, we will examine the impact of adding in measures that reflect changes in

the focal cadet as he moves through his first and second year at VMI on predicting leadership ratings. Intermediate constructs depicted in the model over time, such as self-esteem and hardiness, provide opportunities to assess changes in these measures and their impact on leadership ratings.

Essentially, the model presented in Figure 1 examines the use of a causal framework to assess relationships between a focal cadet's cognitive ability, early life experiences, interpersonal style, temperament, personality, and measures of transformational versus inactive laissez-faire leadership provided by subordinate raters. A parallel model (see Figure 2) predicts measures of leadership provided by students that are senior to the focal cadets. Leadership ratings in the current model are presented as the criterion. The only difference between Figures 1 and 2 are the dependent variables. In Figure 1, the dependent variable is subordinate leadership ratings, while in Figure 2, leadership ratings were provided by the focal cadet's superior.

Pertinent and summary literature is reviewed below that supports directly and/or indirectly the inclusion of specific constructs and measures in the respective models presented in Figures 1 and 2. Following a review of the literature, we discuss the methods used in the current study, results, our conclusions concerning the findings, and implications for future research.

Transformational Leadership

Transformational leadership as rated by superiors and subordinates of focal cadets provided the criterion measure of leadership used in the current research study. Transformational leadership consisted of five factors including attributed and behavioral charisma, inspiration, individualized consideration, and intellectual stimulation (Bass & Avolio, 1990, 1993). Each of these constructs and corresponding behaviors was discussed in detail in Atwater, et al., (1994), as well as in Bass and Avolio (1990, 1993). As noted by Bass and Avolio (1993), although conceptually distinct, each of the transformational leadership factors are highly intercorrelated and thus, were tested as an overall construct in the current study.

As noted in Figures 1 and 2, for the purposes of providing a more comprehensive assessment of each focal cadet's leadership, ratings of transformational leadership were collected from two sources. The sources included students who were more senior to focal cadets (i.e., juniors and seniors when focal cadets were sophomores) as well as those raters who were subordinate to focal cadets (i.e., freshmen when focal cadets were sophomores).

In the current study we have also examined relationships of the antecedent measures presented in Figures 1 and 2 to measures of constructive and corrective leadership/management styles, as well as laissez-faire leadership. Again, each of these constructs is defined in detail in Atwater, et al. (1994).

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Life Experiences and Leadership Traits

Until the mid to late 1980's, the emphasis on associating personality traits and leadership had dropped-off dramatically in the literature. This trend was due in part, to a misinterpretation of remarks made by Stogdill (1948). Stogdill's (1948) classic study was widely misinterpreted as supporting the importance of situational predictors of leadership, while de-emphasizing individual traits and characteristics. In fact, his survey of the literature on leadership traits concluded that leaders revealed greater capacity (intelligence and originality), achievement (knowledge, and athletic accomplishment), responsibility, (initiative and persistence), activity, (sociability and humor), and status (social status and popularity). Yet, the traits that were most salient to leadership depended to some extent on the needs of the situation.

Nonetheless, summaries by Mann (1959) and Stogdill (1974) provided additional justification for linking traits to performance as a leader. Clearing up earlier errors of analysis and misinterpretations, Kenny and Zaccaro (1983) reported that between 49% and 82% of the variance in leadership emergence could be attributed to differences in individual traits. Similarly, Cornwell (1983) found that traits such as dominance and intelligence yielded strong relationships (i.e., multiple correlations were obtained in the range of .3 to .5) in predicting leadership emergence and performance. Similar patterns regarding relationships between individual traits and leadership ratings have been provided by Lord, DeVader and Alliger (1986) in their meta-analytic review of the literature.

Although we now have a more comprehensive view concerning the use of traits to predict leadership, the overall utility of using individual characteristics to predict leadership ratings may still be underestimated. Specifically, most prior research summarized in these respective quantitative reviews examined the relationship between individual traits and leadership using simple bivariate research designs (Mumford, O'Connor, Clifton, Connelly & Zaccaro, 1993). These bivariate strategies are characterized by correlating individual traits with ratings of leadership, generally at a single point in time or cross-sectionally, even though leadership is most likely caused or affected in its development by a number of interrelated factors. Consequently, a basic rationale for developing and testing a causal model to predict leadership is that leadership is most likely shaped by a number of individual characteristics linked at various developmental phases. This would be more accurately tested if considered simultaneously.

| Measured Previously (High School) | Prior-measured 1st Semester | 1st Semester | 2nd Semester | 3rd Semester | 4th Semester & 5th Semesters (First and Second Data Collection Periods) |
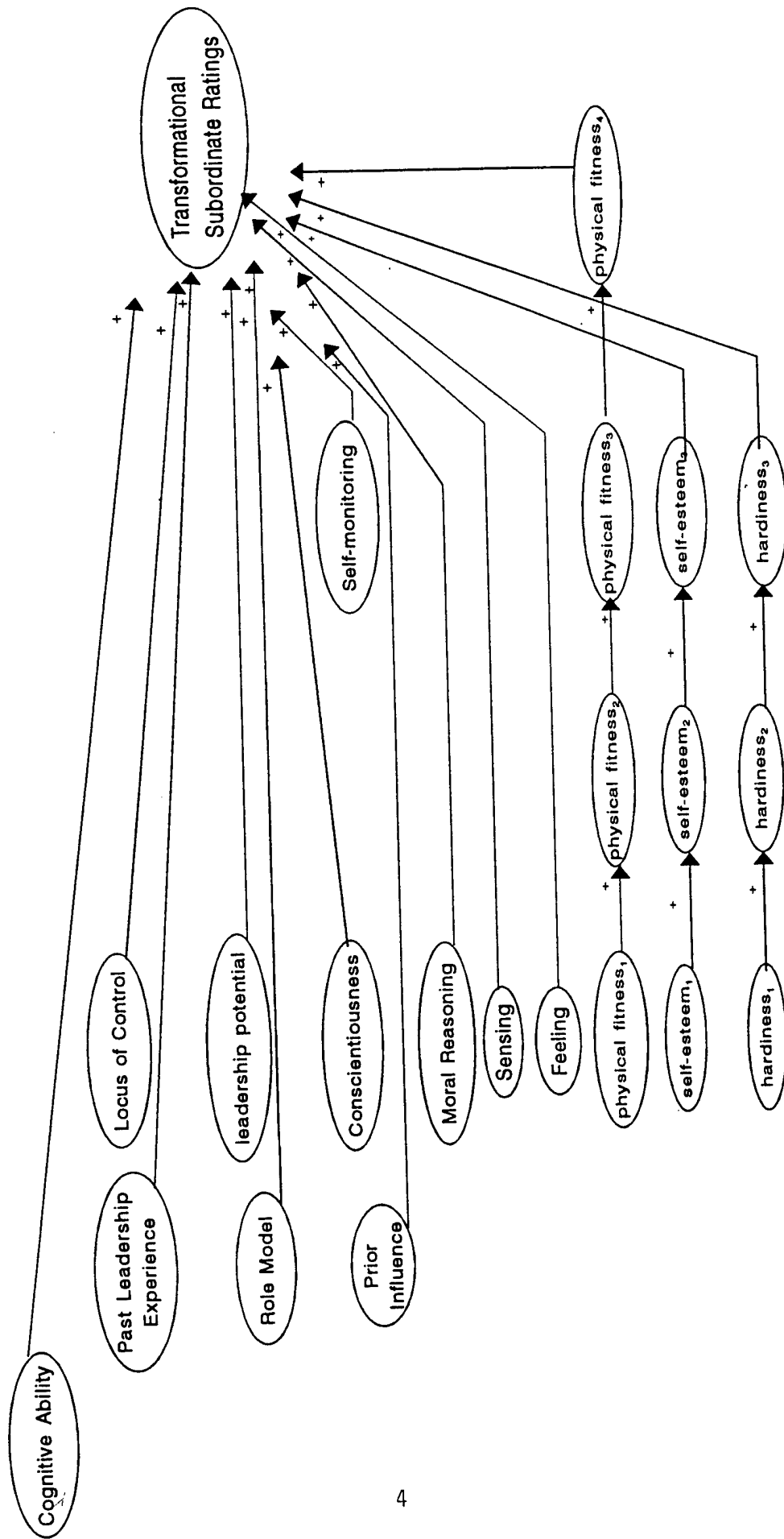
Fall, 1991 - - - - - - - - - - - - - - - - - - - Fall, 1993 - - - - - - Spring, 1994

Figure 1 Predicting Subordinate Ratings of Transformational Leadership

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Figure 2 Predicting Superior Ratings of Transformational Leadership

Fall, 1991 - - - - - - - - - - - - - Fall, 1993 - - - - - - - - - - - Spring, 1994

The following structural/path model appears in the figure:

Measured Previously (High School)	Prior-measured 1st Semester	1st Semester	2nd Semester	3rd Semester	4th Semester & 5th Semesters (First and Second Data Collection Periods)

Nodes and labels in the diagram:

- Transformational Superior Ratings
- Cognitive Ability
- Past Leadership Experience
- Locus of Control
- Role Model
- leadership potential
- Prior Influence
- Conscientiousness
- Moral Reasoning
- Sensing
- Feeling
- Self-monitoring
- hardiness$_1$, hardiness$_2$, hardiness$_3$
- self-esteem$_1$, self-esteem$_2$, self-esteem$_3$
- physical fitness$_1$, physical fitness$_2$, physical fitness$_3$, physical fitness$_4$

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The current study attempts to overcome shortcomings of previous research by testing a more comprehensive profile of individual characteristics that were expected to predict ratings of transformational leadership, as compared with other contrasting styles such as inactive laissez-faire leadership. A basic premise for the models presented in Figures 1 and 2 is that individual characteristics relevant to the prediction of transformational leadership, will, in combination, more accurately predict transformational leadership than any single measure in isolation.

Early Life Experiences and Role Models. Over the last thirty years, a considerable amount of work has been published examining the use of life history and/or biodata for predicting a whole range of subsequent behavior, including leadership (Mumford, Stokes & Owens, 1990; Stricker, 1989). A core argument in this literature is that past behavior and experiences capture characteristic ways that people interact, and also provide some clues to understanding the development of individual personalities, interests and abilities (Mumford & Stokes, 1992). Since past experiences condition how individuals respond to future events, they establish a framework in which an individual has some operational experience he or she can employ. It then follows that individuals would be expected to apply this framework in subsequent situations.

Owens (1976) argued that life history items should be used to represent a developmental framework that one can apply to the examination and explanation of subsequent individual differences. The basis for his argument is that prior experiences shape the situations into which one chooses to enter and the responses made by an individual to those situations. For example, certain life experiences, such as parents who consistently support a child for taking responsibility for his or her own behavior, may contribute to an individual who, as an adult, feels comfortable taking on challenges for which he or she is personally responsible (Avolio & Gibbons, 1988). Indeed, life experiences shape individual characteristics, and in turn, those characteristics condition individuals to select situations that they are most prepared to handle, and from which they will derive the greatest reinforcement (Mumford & Stokes, 1992).

Consequently, by assessing specific life experiences and/or events accumulated over time, we can gain a better understanding of the events that have shaped an individual's development with respect to leadership style and behavior. Moreover, by knowing the past history of individuals, we can determine with greater precision the likelihood of them choosing to enter into specific situations, thus helping to explain why some individuals emerge and excel in certain contexts, while others have difficulty adapting to the same situation.

Sufficient evidence supporting the validity of biodata items has been provided in a number of prior sources. For example, Rothstein, Schmidt, Erwin, Owens and Sparks (1990) furnished evidence supporting the stability of biodata item validities for a period of up to eleven years. Barge and Hough (1988) completed a review of over 100 studies that used biodata surveys, concluding that the median correlation for predicting job performance was .32.

More specific to the current study, there is evidence to support the use of biodata items in predicting leadership performance in industry (Morrison & Sebald, 1974), as well as supervisory evaluations of leadership potential at the U.S. Naval Academy (Russell, Mattson, Devlin & Atwater, 1990; Stricker, 1989). Mumford, et al. (1993) reviewed evidence supporting the use of biodata for assessing adolescent leadership activities and reported that exposure to positive role models, a broad range of experiences, and a supportive home environment each positively related to an individual's likelihood of engaging in leadership activities.

Lord and Hall (1992) also encouraged the use of measures of prior experience to predict leadership. Specifically, Lord and Hall argued that the accumulation of expertise and experience develops in leaders a cognitive framework for not only seeking out problems, but also for use in determining potential and appropriate solutions to those problems. Through a multitude of experiences, individuals develop expertise and knowledge-based structures that enable them to more effectively address problems, as well as take advantage of opportunities. This experience-based structure is expected to increase the likelihood of them emerging as leaders in situations where that experience is most applicable.

Lord and Hall (1992) emphasized the importance of tracking a broad range of prior leadership experiences. This is consistent with the Mumford, et al. (1990) criticism of previous leadership literature, which indicated that to maximize the prediction of leadership, one must view it within a multivariate framework.

A number of authors have provided evidence showing that life history items can be developed and scaled to capture performance-relevant constructs, such as leadership (Kuhnert & Russell, 1990; Mumford, Uhlman & Kilcullen, 1992; Schoenfeldt, 1989). With this approach, one starts with a judgmental grouping of items with relevance to the performance domain being measured. Following the generation of items based on these qualitative judgments, empirical scales are developed and validated.

Mumford, et al. (1993) used the methods described above to develop an "Adolescent Leadership Activities" scale, comprised of biodata items tapping situations where one would be expected to influence others, and behaviors that would typify effective implementation of attempts to influence others. This scale has been shown to have adequate reliability in subsequent research summarized by Mumford, et al. (1993). More importantly, such activities have been shown to be positively related to measures of self-esteem, cognitive ability, style of social interaction and motivation. How well participants were able to adapt and potentially lead in current environments was most strongly correlated with greater frequency of influence activities in the target individual's past. This pattern of results was obtained regardless of whether the leadership activities were collected with self-report or from other sources. In terms of the current study, the findings reported with the Adolescent Leadership Activities Scale are likely to

be generalizable to the current sample of focal cadets who entered the VMI institution in late adolescence.

In sum, sufficient prior evidence is available to support the inclusion of biodata measures in the prediction of leadership ratings. In the current study, we will examine certain early life experiences deemed relevant to the prediction of leadership ratings.

Individual Characteristics

As noted above, recent evidence supports the use of personality traits and other individual characteristics when attempting to predict the emergence of leaders in groups. Based on previous work, a number of specific characteristics were included in this study. These were cognitive ability, locus of control, leadership potential, conscientiousness, moral reasoning, sensing, feeling, physical fitness, self-esteem, hardiness and self-monitoring. Each construct and its relevance to the prediction of leadership is discussed below.

Cognitive Ability. One of the earliest characteristics to be examined with respect to assessing leadership emergence was intelligence or cognitive ability (Bass, 1990). Leaders are expected to identify and solve problems, which requires a sufficient level of cognitive ability (Fleishman, Mumford, Zaccaro, Yarkin-Levin & Hein, 1991; Jacobs & Jaques, 1989; Mumford & Gustafson, 1988).

Results of a meta-analysis of 18 studies of leadership conducted across a diverse range of settings by Lord, et al. (1986), indicated that the aggregate correlation between intelligence and leadership was .50. Mumford, et al. (1993) have also provided evidence that cognitive ability can be a significant and positive predictor of leadership at the level of validity reported by Lord, et al. (1986). Lord and Hall (1992) similarly argued that cognitive ability levels will determine the extent to which leaders were more successful at anticipating and recognizing problems, thus improving their ability to influence others. Most other reviews of the relationship between leadership and intelligence have reported "unadjusted" correlations in the range of .3 to .4 (see Bass, 1990; Fiedler, 1992; and Stogdill, 1974 for more comprehensive reviews of this literature).

In the current study, we have used SAT scores as a measure of individual cognitive ability. SAT scores have been used in earlier research as a general measure of cognitive ability (Byrnes, 1994; Gustin, 1994). In line with prior research noted above, we expected cognitive ability to positively predict ratings of transformational leadership.

Locus of Control. Locus of control refers to the view people develop regarding the extent to which they are in control of their own destiny (Rotter, 1966). Rotter argues that when individuals receive information about their success or failure, or about

changes in their immediate environment, they differ in how they encode and interpret that information. For example, people who interpret their success or failure as largely caused by their own actions are said to have an internal locus of control. If they interpret their success or failure as a product of external forces or factors, they are described by Rotter as having an external locus of control. Individuals with an internal locus of control are more likely to engage in actions to improve their environment, place greater emphasis on striving for achievement, and are more inclined to take responsibility for developing their own skills (Rotter, 1966; Seeman, 1982).

Evidence regarding Rotter's measure of locus control for predicting leadership has been somewhat mixed. While some prior research has not found a consistent relationship between internal locus of control and leadership emergence and performance (DeBolt, Liska & Weng, 1976; Nystrom, 1986), other research has shown a positive relationship between internal locus of control and the level of persuasiveness exhibited by the leader (Anderson & Schneier, 1978; Johnson, Luthans & Hennessey, 1984), as well as the degree to which the leader was rated as transformational by subordinates (Howell & Avolio, 1993).

Bass (1985) predicts that leaders who are rated more transformational by others will view themselves as having a higher internal locus of control. Howell and Avolio (1993) found support for this prediction using a sample of business managers. In the current study, we included locus of control in the model to replicate the results in a different population of leaders, and in turn, to provide a further test of the predictions in the Bass (1985) model.

Leader Potential Index. The California Psychological Inventory (CPI) was developed according to Gough (1969) to assess traits and interpersonal behaviors that arise from and operate in the domain of the social environment. Leadership is one of these significant interpersonal behaviors, and the CPI can be used as one measure of individual differences that has been validated for predicting leadership.

Several prior studies have provided a basis of support for Gough's conclusions (Armilla, 1967; Carson & Parker, 1966; Campbell, 1990; Collins, 1967; Elliott, 1960; Johnson & Frandsen, 1962; Liddle, 1958; Megargee, Bogart & Anderson, 1966). Each of these studies indicated that there was some utility in using the CPI for predicting ratings of leadership.

Gough (1969) provided empirical support for optimum weightings of CPI scales successfully differentiating leaders (nominated by classmates in high school) from nonleaders. The five scales he identified were dominance, self-acceptance, sense of well-being, good impression, and achievement via independence. The weights found for each scale indicated that leaders favored dominance and self-acceptance, higher levels of well-being, and independence and innovation in the expression of need for achievement. Social desirability (good impression) was negatively weighted in this

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grouping of variables from the CPI. This weighted subscale is referred to as the Leader Potential Index (LPI).

More recent research cited in Gough (1990) confirmed this earlier pattern of results for the LPI scales. For example, dominance, self-acceptance, well-being and achievement via independence were positively related to leadership in samples similar to the focal leaders involved in the current study; e.g., male cadets at West Point. However, as reported by Megargee and Carbonell (1988), the single best predictor of leadership potential was dominance. The median correlation for the five scales in predicting leadership has been found to be similar to the correlation for the dominance scale alone. Since the current study was attempting to predict facets of leadership generally not included in previous studies, and to explain the emergence and development of leaders, all five scales comprising the LPI weighted index were included in this study.

Conscientiousness. Conscientiousness includes characteristics such as having a sense of purpose, and being responsible and persistent. Each of these characteristics has been hypothesized by Bass (1985) to be associated with transformational leadership.

Mount and Barrick (1993) have reported that conscientiousness was the best predictor of occupational performance in a series of studies spanning thirty-six years. Bentz (1990) reported that conscientiousness and emotional stability were predictive of advancement rates to senior executive ranks at Sears. Mumford, et al. (1993) also have shown a strong positive relationship between emotional adjustment, stability, and adolescent leadership activities. Similar patterns also have been reported previously in the leadership literature by Stogdill (1948, 1974), who found that emotional stability and conscientiousness were both positively related to leader emergence.

Moral Reasoning. For the purpose of the current study, the construct of moral reasoning can be interpreted within the framework of constructive developmental theory (Kegan & Lahey, 1984; Kohlberg, 1969; Kuhnert & Lewis, 1987). Kegan and Lahey's (1984) constructivist theory of development builds on Kohlberg's (1969) model of moral development by attempting to classify individuals at various points across the life-span with respect to how they construct and interpret events and derive meaning from those events in the world around them. Kegan and Lahey view leadership development as being a function of "the qualitative change in the meaning system which occurs as one's cognitive complexity level increases" (Kegan & Lahey, 1984, p. 202).

According to Kegan and Lahey (1984), how individuals structure and interpret the meaning of events to which they are exposed represents their level of conscientiousness and/or moral reasoning. Individuals at the lowest level of moral reasoning view events in terms of being centered around themselves. As individuals mature in terms of levels of moral reasoning, behavior becomes more internally driven, with the meaning associated with events derived from an individual's internal standards.

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At higher moral reasoning levels the individual's self-identity is considered firmly established and independent of external forces. In this regard, the individual is more inner-directed, and therefore, more able to transcend the interests of the moment. Actions are more value-based rather than derived from the situation. Leaders at higher levels of moral reasoning are expected to be more concerned about the development of others versus exclusively focusing on their own needs and development (Kuhnert & Lewis, 1987). These individuals exhibit a self-determined sense of identity, which allows them to make difficult choices when faced with ethical dilemmas.

Kuhnert and Lewis (1987) have generalized Kegan and Lahey's constructivist theory of development to explain the emergence and development of transformational leadership. They argued that to be transformational, a leader must be at the higher stages of conscientiousness and moral reasoning. The ability to consider the needs of the group and to sacrifice one's own gain for the good of others is, by Burns' (1978), Bennis and Nanus' (1985) and Bass' (1985) definitions, at the core of transformational leadership.

Simply put, our position is that individuals who function at higher levels of conscientiousness and moral reasoning are more likely to be seen in the VMI context as transformational by their superiors and subordinates. Specifically, being honest and honorable is an extremely important facet of VMI's culture (Bass, 1992). In this context, it should follow that a leader who is principled would be seen by his superiors and subordinates as more transformational when compared to other focal cadets.

Sensing and Feeling. Two measures of decision style assessed by the Myers-Briggs Type Indicator (MBTI) have been shown to be related to transformational leadership among military leaders. Specifically, Roush and Atwater (1992) found that U. S. Naval Academy midshipmen who scored high on sensing (as opposed to intuition), and high on feeling (as opposed to thinking) were rated by followers as more transformational. Individuals who score high on the sensing scale focus on reality in the "present time," attend to what is practical, and emphasize details. These leaders may be seen as those who provide clear and practical goals. Those who score high on the feeling dimension emphasize consideration of others' feelings and consider personal and group values in making decisions. It was hypothesized that these two personal styles would be related to leadership among VMI focal cadets.

Physical Fitness. In a study of male cadets at West Point, Rice, Yoder, Adams, Priest and Prince (1984) reported a positive correlation between physical aptitude and being viewed as having leadership ability. Atwater and Yammarino (1993) found athletic participation to be the best predictor of follower ratings of transformational leadership among midshipmen at the U.S. Naval Academy. Yammarino, Spangler and Bass (1993) also reported a significant relationship between military performance scores obtained at the Naval Academy (which are based in part on physical fitness scores) and ratings of transformational leadership collected over a ten-year time span.

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Similar to the West Point and Naval Academy contexts, physical fitness at VMI is considered to be a critical measure against which all cadets are compared for leadership potential. Moreover, anecdotal evidence collected in interviews with cadets by the principal investigators suggested that those cadets who were in the best physical condition often were seen by other cadets as more effective role models and were more highly respected.

Conversely, cadets often made disparaging comments about other more senior cadets who exhibited poor levels of physical conditioning, yet expected high levels of physical conditioning from their followers. Less fit senior cadets were derided by fellow cadets for not exhibiting the type of behavior they expected from others. They appeared to be the least respected cadets.

In sum, being an effective role model has been considered to be a central characteristic of transformational leadership (Bass & Avolio, 1993; House & Howell, 1992). In the VMI setting, being a role model requires good physical conditioning. Consequently, physical fitness was used to predict subsequent leadership ratings. Physical fitness measures were collected at multiple points in time, allowing us to examine variations in level of physical fitness over time in predicting leadership ratings.

Self-esteem. Self-esteem refers to how positively or negatively one views himself or herself. Bray, Campbell and Grant (1974) argued that individuals with higher levels of self-esteem were more likely to take on challenging problems. Indeed, Mumford, et al. (1993) have reported a strong positive correlation between levels of self-esteem and the number of prior leadership activities engaged in by individuals. Similarly, Bennis and Nanus (1985) concluded from their study of leaders that each had a positive self-image (or high self-esteem), and therefore, was more able to make difficult decisions without needing consistent social approval for their actions. Bass (1960) hypothesized that individuals with higher levels of self-esteem would be more likely to take on leadership roles, and Andrews (1984) reported that students with higher levels of self-esteem were more likely to emerge as leaders.

In the current setting, a focal cadet's level of self-esteem was expected to positively relate to being rated as more transformational. Since measures of self-esteem were collected over time, we also examined trends in levels of self-esteem over multiple data collection periods to determine whether variations in self-esteem levels added to the prediction of leadership ratings.

Hardiness. Because leaders, particularly military leaders, often must confront and operate successfully within stressful conditions, stress tolerance, or hardiness was expected to be a predictor of leadership. Hardiness is a measure of an individual's social, physical and psychological resources for coping with stress. One's ability to cope with stress has been shown to predict which managers can best withstand stress without becoming ill or debilitated (Kobasa, 1979; Kobasa, Maddi & Puccetti, 1982). Due to the stressful nature of the VMI environment, with respect to time management pressures and physical conditioning demands, it was predicted that those with the

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highest degrees of hardiness would be more likely to emerge as transformational leaders.

Self-monitoring. Snyder (1974) operationally defined high self-monitors as being more aware and/or perceptive of social cues, and more capable of using those cues to adjust and control their behavior. Low self-monitors show no such awareness to social cues and tend to not vary their behavior across situations. In short, high self-monitors are sensitive to cues about the appropriateness of various types of behavior and have the ability to modify their own behavior accordingly (Lennox & Wolfe, 1984; Snyder & Mason, 1975).

Kenny and Zaccaro (1983) indicated that experienced leaders are more sensitive to subtle differences in group situations and adjust their behavior accordingly. Zaccaro, Foti and Kenny (1991) reported that 59% of the variance in leadership emergence in groups was attributable to social perceptiveness and behavioral flexibility. Zaccaro, et al. (1991) reported that high self-monitors tended to emerge as leaders in leaderless groups. Foti and Cohen (undated) confirmed this pattern of results. Scores for emergent leaders were significantly higher on measures of self-monitoring.

In sum, preliminary evidence suggests that those individuals who score higher on self-monitoring will be rated more transformational by superiors and subordinates. The sensitivity to social cues and ability to adapt or control one's behavior in different situations are seen as key components of being an effective transformational leader.

Integration and Summary of Prior Literature

The review of previous literature cited above leads to several general conclusions. The prediction of leadership should consider the "whole" person, rather than parts, as has been true of a large percentage of earlier research. Prior research has often excluded measures that would likely enhance predictions of leadership emergence and development. Second, there is support for including each of the various individual construct measures discussed above. Yet, there are relatively few studies available in the leadership literature that have attempted to take a comprehensive view in predicting leadership over an extended period time. Third, because several measures were collected over time, we are able to examine trends in these measures with respect to predicting leadership ratings. This allows us to examine to what degree the characteristics exhibited by focal cadets upon entry into the institute predict leadership ratings two to three years later. In addition, we can review changes in the individual's leadership ratings over time and examine the antecedents that predict those changes. Finally, and most important, prior leadership research has generally not attempted to predict transformational leadership (as opposed to leadership in general), and thus, the current study breaks new ground in predicting the kind of leadership that

has been shown to have a much greater impact on effort and performance than transactional leadership (Bass & Avolio, 1993).[1]

METHOD

Focal Cadet Leaders. All 401 cadets who enrolled at VMI in August of 1991 comprised the initial sample of focal cadet leaders. This class of cadets less those who attrited, was studied throughout their freshman, sophomore and most of their junior years at VMI. Most of the predictor measures were collected from focal cadets when they were entering freshmen. Leadership ratings were collected from subordinates and superiors about the focal cadets' leadership during the Fall and again in the Spring semesters when the focal cadets were sophomores and juniors, respectively. We refer throughout this report to the first and second data collection periods for the leadership and management style surveys. During the first data collection period, 263 cadets remained in the class. During the second data collection period, 254 cadets remained in the class. One hundred forty-seven focal cadets had left the Institute. Sixty-five cadets attrited during the first semester (August to December, 1991). Thirty-two cadets attrited from January to May, 1992 (second semester). Thirty-one cadets attrited from June to December, 1992 (summer and third semester). Ten more cadets attrited prior to the first data collection period and nine more cadets attrited prior to the second data collection period, leaving a total of 254 cadets.

Subordinates. In the hierarchical structure at VMI, all freshman and sophomores are considered subordinate to juniors and seniors. These subordinates were asked to rate the focal cadets' leadership from the perspective of followers.

In the first data collection period, 69 focal cadets were rated by one subordinate, 46 were rated by two subordinates, and 112 were rated by 3 or more subordinates. The breakdown of raters for the second data collection were 99, 31 and 11, respectively. Differences in the number of raters over time, per focal leader, was due to the number of subordinates who had contact and were familiar with the focal leaders.

Superiors (Seniors). In the cadet rank structure at VMI, seniors are considered to be superiors to the three lower classes. In the first data collection period, 83 focal cadets were rated by one superior. Thirty-four focal cadets were rated by two superiors, and 14 focal cadets were rated by three or more superiors. In the second data collection period, 86 focal cadets were rated by one superior, 42 focal cadets were rated by two superiors, and 13 focal cadets were rated by three or more superiors.

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[1]Further evidence for the construct validity of measures used in the current study is presented in Atwater, et al. (1994). A copy of this report can be obtained from the first author.

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PROCEDURES

During the cadets' first two years at VMI each survey completed by focal cadets and their raters was administered in an assembly with coordination and supervision provided by a principal investigator and several research assistants. Attendance at these sessions was mandatory, however, exceptions were granted for those cadets with special permit conflicts. Cadets excused from these initial data collection sessions received the appropriate surveys by mail for completion and return to the principal investigator. The types of surveys administered by this procedure were the Multifactor Leadership Questionnaire, Leadership/Management Behavior Survey, self-esteem and hardiness assessments, locus of control assessment, and life histories questionnaire.

Surveys designed to evaluate other cadets (ie. peers or upper classmen) required prior specification of cadets' names (ratees) on the survey sheet. Cadets were instructed by the research team to evaluate only the focal cadets listed on their surveys.

The number of leadership evaluations obtained (regarding focal leadership as rated by subordinates and superiors) during the second data collection period were less than the number of evaluations obtained during the first data collection period. Part of the reduction of available ratings during the second data collection period can be attributed to a more selective system for administering the leadership questionnaires. During the first data collection period, raters were randomly assigned three focal cadet names and asked to provide leadership ratings for each cadet. Because we wanted raters who were familiar with a focal cadet's leadership style to provide leadership ratings, the instructions for the second data collection period were slightly altered. The rater was provided a randomly generated list of five focal cadets within his company and asked to rate the first three cadets on the list. If a rater was not familiar with a name or names on the list, he was asked to select the fourth or fifth name. If a rater was not familiar with the fourth or fifth name, he was asked to write in a name on his survey whose leadership style he felt qualified to evaluate. The procedure in the second collection period produced fewer ratings, as many raters did not feel qualified to provide ratings of three focal cadets. However, based on feedback from the institute, the variation in selection of focal cadets did provide raters with cadets that they had more experience with in their respective company.

Criterion Measures

Leadership styles were measured using the Multifactor Leadership Questionnaire (Form 5X). This form of the MLQ is the most recent version of an earlier survey published by Bass and Avolio (1990), which is referred to as MLQ (Form 5R). Similar to the MLQ (Form 5R), Form 5X measures the following constructs: (1) five transformational factors: attributed charisma (8 items), charismatic behavior (10 items), inspiration (10 items), individualized consideration (9 items), intellectual stimulation (10 items); (2) three transactional factors: contingent reward (9 items), active management-

by-exception (7 items), passive management-by-exception (7 items) and (3) laissez-faire leadership (8 items). All of the leadership scales had internal consistency reliabilities above .70. The criterion measure of transformational leadership used for the correlational and regression analyses was made up of 47 transformational leadership items. Only a portion of the items comprising the MLQ (Form 5X) were included in the final test of the LISREL model discussed below. The items included were based on prior confirmatory factor analyses, with items chosen for inclusion that had the highest factor loadings. Also, we included items which best represented the content characteristics associated with a particular construct. All leadership items were responded to on a 5-point scale ranging from 4="Frequently if not always," to 0="Not at all." The MLQ (Form 5X) surveys were completed by superiors and subordinates when the focal cadets were sophomores and again when they were juniors.

Leadership/Management Behavior Survey (LMBS). A second survey was designed to measure the constructs that were added to the leadership framework. This survey included items measuring management behaviors, initiating structure, general consideration, contingent and noncontingent punishment and noncontingent reward. Specifically, four items measured each of five management behaviors: directive, persuasive, consultative, participative and delegative. These items were adapted from Bass, Valenzi, Farrow and Solomon, (1975).

Five items assessed initiating structure and five items measured general consideration. Items measuring these two constructs were taken from the Leadership Behavior Description Questionnaire (Stogdill & Coons, 1957). Five items assessing contingent punishment, four items assessing noncontingent punishment and four items assessing noncontingent reward also were included. These items were taken from Podsakoff, Todor and Skov (1982).

The LMBS was completed in the same manner as the MLQ, i.e., followers were asked to rate named focal cadets. Where appropriate, follower ratings were averaged to create follower scale scores for each focal cadet. Due to the small number of respondents relative to the number of items, and because items came from published scales, factor analyses were not performed on these data. Scales were created as indicated by their original authors.

Predictors

Cognitive Ability. Cognitive ability was assessed by using Scholastic Aptitude Test (SAT) scores (College Entrance Examination Board, 1989). The SAT was taken by each cadet as part of his admission requirements. SAT Verbal and SAT Math were used as two measures of cognitive ability.

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Early Life Experience. A 22-item biodata measure of life experiences and behaviors was used, called BIOLEAD. The measure drawn from a 73-item biodata questionnaire used at West Point, was empirically keyed to ratings of military performance and leadership during Basic and Field Training at West Point (Mael & Hirsch, 1993). The biodata measures necessary for biolead were administered to all focal cadets during the first week of the focal cadets' first semester.

The methodology used to key BIOLEAD was done in the following manner. First, means on the criterion for each biodata item response were calculated. Next, a 0, 1, or 2 was assigned to each response alternative. If the response fell within .05 of the mean, it was considered to be at the mean and was assigned a value of 1. Responses with means greater than .05 above the mean were assigned a 2, while responses with means greater than .05 below the mean were assigned a 0. If responses were not more than .05 away from the mean, but two heavily-endorsed responses were further than .05 from each other, those responses were recoded 0 and 1, or 1 and 2, depending on whether the higher or lower choice was closer to the mean. (For additional details on methodology, see Mael & Hirsch, 1993).

Role Model. The Life History Questionnaire, also administered during the first year to focal cadets at VMI, was developed based on the early work of Owens (1968) and Owens and Schoenfeldt (1979), and more recently Stokes, Mumford and Owens (1989). This survey was developed using transformational leadership theory as a conceptual model to guide the creation and inclusion of items that are considered to be linked to the development of leadership, particularly transformational leadership. Two items from this survey measured the impact the cadet's mother and father had in terms of serving as a leadership role model. These items were included to predict leadership and had an internal consistency reliability alpha value of .60.

Prior Influence. Nine items from the Life History Questionnaire assessed experiences where focal cadets had demonstrated influence with others. These items were selected by two independent raters on the basis of their content representing the types of influence experiences described by Mumford, et al. (1993). Specifically, each rater identified items that reflected the following criteria: (a) participation in or an attraction to situations where the expectation is to influence others, or (b) behaviors indicative of an effective implementation of influence attempts. Each of the nine items met one of the aforementioned criteria, and the scale created (Prior Influence) had an internal consistency alpha value of .70.

Conscientiousness. The 20 CPI scales (see Gough, 1987) were factor analyzed, attempting to replicate the "Big 5" personality factors suggested by Digman (1990). While factors representing the Big 5 did not clearly emerge, a composite factor representing conscientiousness was identified. The scales loading highest on this composite factor, while not loading on other factors, were responsibility (RE), self-control (SC), achievement via conformance (AC), and socialization (SO). These four scales were included in the analyses as a measure of each focal cadet's level of conscientiousness. The alpha value for this composite scale was .80. The CPI scale labelled social maturity was also included as a measure of conscientiousness based on a content analysis of items comprising this scale. The Social Maturity index is designed to assess self-discipline, judgement, and sensitivity to ethical and moral issues. The index attempts to indicate ability to live comfortably with others, respond appropriately to both ordinary and extraordinary stress, and when appropriate, the ability to rise above or depart from the mores and institutional givens of social control. A high score suggests dependable, mature, rational, and capable individuals who are idealistic, reflective, flexible, steady, organized, stable, and well-disciplined, but open to new experience. A low score suggests persons who are shallow, intolerant, fickle, nervous, temperamental, distractable, and impulsive.

Leader Potential Index. The LPI subscale of the CPI was also included in our analysis. A high score on the LPI suggests the individual has a talent for leadership and is dominant, self-confident, aggressive, rational, logical, clear-thinking, demanding, ambitious, and possibly egotistical. A low score suggests the individual has a potential for leadership that is below average. These individuals are cautious, careful, shy, unassuming, patient, peaceable, submissive, and too cooperative.

The scales used to measure the LPI and conscientiousness measures did not overlap. There was no empirical redundancy between the measures used to represent these two respective latent constructs.

Moral Reasoning. The Defining Issues Test (DIT) (Rest, 1986) was used to assess the cadets' levels of moral reasoning. The DIT is considered to be the most prominent objective test of cognitive moral development. The test consists of six hypothetical ethical dilemmas and a list of considerations for determining what is the right choice to make. Respondents must decide the action they would take and the reason they made that decision. Subjects rank the four most important considerations and these rankings are used to create the subject's moral reasoning score. Tests are scored at the Center for Ethical Development and results are sent to researchers. The test is scored on a scale ranging from 0 to 95, with a high score representing a higher level of moral reasoning. This test was administered during the first week of the first semester. The average score for the focal cadet class was 29.15, indicating that compared to national norms for college students, the general level of moral reasoning for the focal cadets in this study was on average, rather low.

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<u>Sensing/Feeling</u>. Sensing and Feeling were measured using the Myers-Briggs Type Indicator (MBTI) Form G (Myers & McCaulley, 1985). The MBTI consists of 94 items measuring personal decision style, or the way one approaches the solution to problems. Four separate bipolar indices, each comprising two mutually exclusive preferences, constitute the MBTI. Two of these indices were used in this study; Sensing (S) versus Intuition (N) and Feeling (F) versus Thinking (T). The Sensing/Intuition scales refer to the way individuals prefer to receive information. Those with a sensing preference prefer receiving information gathered through the five senses, whereas those whose preference is intuition see possibilities, meanings and relationships among data and events that go beyond the data as given. Sensors rely on what is practical; intuitors focus on the theoretical and abstract. For the thinking versus feeling index, the means of decision-making are relevant. Persons with the thinking preference apply objective analysis and rely on logical consequences. Thinkers are concerned with principles of justice and fairness. They approach life from an impersonal cause-and-effect perspective. The decision maker whose preference is feeling is marked by greater reliance on the subjective and by emphasis on an interpersonal component.

Individuals receive scores based on the extent to which they demonstrate a thinking versus feeling preference and a sensing versus intuiting preference. Scores on sensing/intuiting in this sample ranged from 0 to 34, with a mean of 16.12. A higher score indicated a greater sensing preference as opposed to a intuitive preference. Scores on thinking/feeling in this sample ranged from 0 to 18, with a mean of 6.97. A higher score indicated a feeling preference as opposed to a thinking preference.

<u>Physical Fitness</u>. The long-term objective of this test is to habituate cadets to exercise and to establish life-long standards for physical fitness. Scores on physical fitness were collected at several time periods throughout the focal cadets' first and second years at VMI. This physical fitness test is the VMI fitness test which is given to each cadet semi-annually (in November and April) as part of their physical education grade. This test consists of three events, including pull-ups (maximum number done), situps (maximum number done in two minutes) and a one and one-half mile run for time. Scores are based on standardized tests in the aforementioned three events. The test score is the sum of the individual events and can vary from 0 to 300. Scores ranged from 105 to 293. The average fitness score at each time period was: <u>Time 1</u>: 186.52; <u>Time 2</u>: 207.47; <u>Time 3</u>: 206.74; and <u>Time 4</u>: 213.19.

<u>Self-Esteem</u>. Ten items measuring self-esteem were taken from the Rosenberg Self-Esteem Scale (Rosenberg, 1965). These ten items measure self-respect and the extent to which an individual considers himself personally worthy. Self-esteem was measured at three points in time on a scale of 1-5, with 5 indicating higher self-esteem. The average self-esteem score at each time was: <u>Time 1</u>: 3.35; <u>Time 2</u>: 3.28; and <u>Time 3</u>: 3.31. Coefficient Alpha values for these three periods were .81, .85, and .88, respectively.

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Hardiness. A measure of stress coping ability which assessed the cadets' social, physical and psychological resources for coping with stress was administered at three time periods throughout the two-year period (see Kobasa, et al. 1982). This test contains 35 items that measure three aspects of hardiness; one's level of commitment to the stressful situations or challenges they face, one's perceived control in dealing with those situations and whether the situation is seen as a threat or a challenge. The hardiness items were rated on a ten-point scale with a higher score representing a higher level of hardiness. The average hardiness scores at each time period on a scale of 1 to 10 were: Time 1: 7.17; Time 2: 6.18; and Time 3: 7.06. Coefficient Alpha values for these three periods were .92, .91, and .91, respectively.

Self-monitoring. A self-monitoring scale containing thirteen items measured on a five-point scale was administered to the focal cadets during their second year at VMI. This scale was originally developed by Snyder (1974), and revised by Lennox and Wolfe (1984) to assess the extent to which individuals are capable of monitoring behavior deemed appropriate or desirable in specific situations. The Lennox and Wolfe 13-item scale (1984) was used in the current study to measure two aspects of self-monitoring: perception and control. The perception scale contained 6 items and had a mean of 3.56 and an alpha reliability of .71. The control scale contained 7 items and had a mean of 3.61 and an alpha reliability of .72.

ANALYSES

The unit of analysis for the statistical tests described below was always the focal cadet. Where there were multiple ratings of a focal cadet, such as with the MLQ (Form 5X), ratings were aggregated for each focal cadet.

Several steps were undertaken to analyze the data collected for the current study. First, descriptive statistics and reliability estimates were calculated for each scale for the initial period of data collection as well as for scales collected over multiple periods of time. Next, all antecedent measures were correlated with the leadership measures described above, followed by a series of hierarchical regression analyses. The hierarchical regression analyses were modelled based on the conceptual ordering of variables presented in Figures 1 and 2, with variables being blocked and entered based on conceptual similarity and based on the time period in which data were collected. Not all variables were included in these analyses due to high levels of multicollinearity for measures assessing similar constructs.

LISREL 7 procedures also were used to test the causal models presented in Figures 1 and 2 for subordinate and superior ratings, respectively (Joreskog & Sorbom, 1989). There were several reasons for choosing this strategy for testing these respective causal models. First, these procedures permit the estimation and testing of causal patterns controlling for the effects of random error. Second, by using LISREL we can also simultaneously test the validity of the measures and items comprising them for

predicting leadership ratings. Hence, a LISREL model consisting of a substantive, as well as measurement model, were each tested in the current study.

The substantive model related measures (in some cases collected over multiple time periods) tapping personality, life history, temperament, cognitive ability, physical ability, prior leadership experience and interpersonal style to ratings of transformational versus laissez-faire leadership collected from both superior and subordinate raters. (Laissez-faire leadership was included in the LISREL analyses to assess the overall discriminant validity of the causal model). Transformational and laissez-faire leadership ratings represented latent endogenous variables, while the remaining measures were latent exogenous variables.

A measurement submodel was also tested that included the latent casual factors and the observed measures (Xs and Ys) of these unobserved constructs. Each of the observed variables was assumed to be a function of an underlying latent construct specified by prior empirical work and our theoretical model (see Lau, et al. (1993) for further details on the model), as well as random error terms for both the exogenous and endogenous variables depicted in the models presented in Figures 1 and 2.

The measures representing the exogenous variables in this causal model were in some cases collected nearly two years prior to the collection of leadership ratings. As noted above, some of these measures were collected at multiple points in time, (e.g., self-esteem), thus later collections of these measures occurred in closer proximity to the collection of leadership ratings. The multiple data collections on measures such as self-esteem provided us with an opportunity to test both the absolute levels on these respective measures in predicting transformational versus laissez-faire leadership, as well as incorporating trends on these measures in the prediction of leadership ratings.

The predictors and criterion measures in this model were for the most part collected from independent sources, over different time periods, thus using the assumption in LISREL that the error terms are uncorrelated is reasonable. However, many of the predictors were collected from a single source, the target leader, therefore the estimated parameters among these measures may reflect some correlated errors among the measures as well as substantive relationships between underlying latent variables/constructs. In this regard, levels of multicollinearity were tested resulting in several refinements to the LISREL Models discussed below.

Several LISREL-based statistics were used to test the models presented in Figures 1 and 2. The models were estimated using a maximum likelihood procedure, the null model of no relationship among the latent measures was similarly estimated, and was used to test the overall hypothesis that the general model provided a better fit for the data than the null model. Specific hypotheses were tested by means of one-tailed tests of specific parameters. A number of other measures of model adequacy were also examined. Specifically, coefficients of determination for variables and

equations should be between 0 and 1.00, variances for measures should be positive, and correlations should fall in the -1.00 to 1.00 range (Long, 1983a, 1983b).

Joreskog and Sorbom (1989) stated that the chi-square estimate is not accurate when a correlation matrix is analyzed instead of the covariance matrix. Furthermore, Bollen, (1989) indicated that chi-square tests and other significance tests may not be appropriate for maximum likelihood estimation procedures of correlation matrix inputs, and suggested weighted least squares procedures may be a better choice. Based on these arguments, we will use as estimates of model fit the Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI) and Root Mean Square Residual (RMSR) indicators, although we do report the results of the chi-square tests.

In sum, LISREL provides an analytical framework that allows for all of the variables in the model to be analyzed concurrently.

Supplemental analyses were conducted to evaluate the potential effects of attrition on path coefficients. Because a pairwise deletion was specified in the LISREL programs, any cadet that attrited prior to the first MLQ administration during Spring 1993 was not included in the analyses. Thus, data from 138 attrited cadets were excluded from all analyses during the first data collection period. Furthermore, only nine focal cadets attrited after the first administration of the MLQ, and prior to the second administration (second data collection period). Thus, data from 147 attrited cadets were excluded from all analyses during the second data period. The net change as it relates specifically to attrition from the first data collection models to the second data collection model was nine focal cadets.

Additionally, we examined changes in our results that might be due to missing data on the MLQ for remaining focal cadets, since this data also were excluded from our analyses by way of pairwise deletion. (We examined the MLQ for missing data, since it was one of our key measures of leadership.) T-tests performed on antecedent variables between those focals who possessed only one MLQ rating by superiors and those who possessed both MLQ ratings from superiors produced no significant differences on any of the predictor variables. T-tests performed on antecedent variables regarding subordinate ratings of focals with only one MLQ versus both MLQs revealed a significant difference on only two variables. Focal cadets with only one MLQ rating possessed somewhat higher levels of self-esteem at time 2 and had higher role model scores. Thus, the two groups of focal cadets, those with only one MLQ rating and those with both MLQ ratings, for the most part were not substantially different from one another with respect to the antecedent measures. These same findings were further confirmed with subsequent LISREL analyses which produced identical findings related to both subordinate and superior ratings for all measures of leadership. However, conclusions regarding changes on these two measures must be viewed considering the patterns noted above. Whether the changes are due to attrition, some factors in the context, or some combination was not directly addressed in the current report.

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RESULTS

Descriptive and Correlational Analyses

Descriptive statistics and reliabilities are presented in Table 1 for each antecedent measure. For the measures of self-esteem, hardiness, and physical fitness, we have presented the descriptive statistics and reliabilities for each measure collected over multiple time periods.

A quick perusal of Table 1 indicates that the mean physical fitness scores for focal cadets increased for the most part over time. Whereas, for self-esteem and hardiness there was an initial drop-off in mean ratings, with a return at time 3 to the mean levels reported at time 1 for each measure. As noted earlier, some of the increase in self-esteem may be partially due to attrition. The pattern of results for the measure of physical fitness would be expected given the significant emphasis that VMI places on physical fitness training of cadets, and the types of daily challenges confronted by focal cadets, including nearly a year-long period of indoctrination (the "ratline"). Estimates of internal consistency reliability were all above .60, and most values exceeded .80.

Descriptive statistics and reliabilities for each leadership and management styles scale completed by <u>subordinate</u> raters are presented in Table 2. These data are presented for both the first and second data collection periods, using subordinate ratings of the focal leaders. Estimates of internal consistency reliability for each scale were all above .70. Intercorrelations among subordinate leadership ratings for both the first and second data collection periods are presented in Tables 3 and 4, respectively.

Descriptive statistics and reliabilities for each leadership and management styles scale for <u>superior</u> raters are presented in Table 5. The reader will note that there were no ratings of management styles collected from superiors during the first period of data collection. This measurement was omitted as it was not feasible to schedule survey completion with the superiors.

The general pattern for the ratings provided by superiors of focal cadets was similar to the data generated by subordinate raters reported in Table 2. Reliabilities for all scales were above .70 for data collected at the two points in time. Intercorrelations among superior leadership ratings for both the first and second data collection periods are presented in Tables 6 and 7, respectively.

Table 1

Descriptive Statistics for Antecedent Measures

Variable	M	SD	n-sizes	α
Time 1				
SAT Verbal	477.97	71.98	371	
SAT Math	535.87	72.08	371	
BIOLEAD	.81	.19	389	
Conscientiousness	22.75	4.63	403	.81
Locus of Control	8.92	3.78	401	
Leadership Potential Index	48.98	5.54	403	
Sensing	16.12	7.59	402	
Feeling	6.97	4.28	402	
Social Maturity Index	48.19	3.33	403	
Role Model	1.79	.81	274	.60
Prior Influence	3.26	.53	275	.70
Moral Reasoning	29.23	12.53	353	
Self-Esteem 1	3.35	.37	391	.81
Hardiness 1	7.17	1.19	389	.92
Physical Fitness 1	186.52	30.63	280	
Time 2				
Self-Esteem 2	3.28	.47	261	.85
Hardiness 2	6.81	1.17	264	.91
Self-Monitoring (Control)	3.61	.60	274	.72
Self-Monitoring (Perception)	3.56	.60	274	.71
Physical Fitness 2	207.46	27.96	282	
Time 3				
Self-Esteem 3	3.31	.46	210	.88
Hardiness 3	7.06	1.17	207	.91
Physical Fitness 3	206.74	28.81	286	
Time 4				
Physical Fitness 4	213.19	35.02	254	

Table 2

Descriptive Statistics for Subordinate Leadership Ratings at Two Data Collection Periods

Subordinate Leadership Ratings	First Data Collection				Second Data Collection			
	M	SD	N	α	M	SD	N	α
Transformational	2.04	.69	275	.97	2.20	.76	122	.97
Contingent Reward	1.89	.71	367	.90	1.94	.77	143	.89
Contingent Punishment	1.88	.73	475	.77	1.87	.76	296	.87
Noncontingent Punishment	1.71	.75	467	.73	1.49	.93	290	.88
Management-by-Exception (Active)	1.96	.55	368	.71	1.85	.68	140	.75
Management-by-Exception (Passive)	1.71	.68	389	.76	1.62	.78	141	.83
Initiation of Structure	1.96	.74	473	.78	1.95	.74	296	.79
Consideration	1.91	.79	467	.79	1.98	.76	288	.80
Laissez-Faire	1.55	.68	359	.83	1.50	.79	143	.88

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Table 3

Intercorrelations Among Subordinate Leadership Ratings - First Data Collection

	TF	CR	CP	NCP	MBE-A	MBE-P	IS	CS	LF
Transformational (TF)	----								
Contingent Reward (CR)	.88**	----							
Contingent Punishment (CP)	.12	.08	----						
Noncontingent Punishment (NCP)	.14	.12	.37**	----					
Management-by-Exception-Active (MBE-A)	.15*	.18**	.08	.02	----				
Management-by-Exception-Passive (MBE-P)	-.33**	-.26**	-.11	.02	.06	----			
Initiating Structure (IS)	.18*	.13	.75**	.16*	.02	-.10	----		
Consideration (CS)	.14	.15*	.51**	.01	-.02	.03	.70**	----	
Laissez-faire (LF)	-.41**	-.27**	-.24**	-.03	.05	.74**	-.26**	-.07	----

* p <.05
** p <.01

Note: Sample sizes for the leadership ratings are as follows: TF (n=217), CR (n=213), CP (n=149), NCP (n=148), MBE-A (n=210), MBE-P (n=209), IS (n=149), CS (n=146), LF (n=212).

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Table 4

Intercorrelations Among Subordinate Leadership Ratings - Second Data Collection

	TF	CR	CP	NCP	MBE-A	MBE-P	IS	CS	LF
Transformational (TF)	-----								
Contingent Reward (CR)	.82**	-----							
Contingent Punishment (CP)	.24*	.26*	-----						
Noncontingent Punishment (NCP)	.02	-.04	-.24**	-----					
Management-by-Exception-Active (MBE-A)	.34**	.32**	.13	.12	-----				
Management-by-Exception-Passive (MBE-P)	-.26**	-.05	-.17	.07	.38**	-----			
Initiating Structure (IS)	.23*	.27**	.69**	-.32**	.15	-.12	-----		
Consideration (CS)	.11	.08	.47**	-.50**	-.02	-.14	.59**	-----	
Laissez-faire (LF)	-.24**	-.01	-.21*	.12	.39**	.73	-.18	-.15	-----

* $p < .05$
** $p < .01$

Note: Sample sizes for the leadership ratings are as follows: TF (n=131), CR (n=124), CP (n=127), NCP (n=125), MBE-A (n=125), MBE-P (n=129), IS (n=127), CS (n=127), LF (n=131).

Results presented in Tables 2 and 5 indicated that the frequency of leadership behavior exhibited by the focal cadets was generally low compared to other samples rated using the MLQ (Form 5X) reported by Bass and Avolio (1994). One explanation for the lower frequency of occurrence is that focal cadets, for the most part, have not yet taken over formal leadership roles at VMI, likely resulting in fewer opportunities to exhibit the full range of leadership and/or management styles. This explanation is supported by comments received from some cadet raters, who indicated that they had difficulty rating focal cadets on these survey instruments. The most common response was that they did not know enough about the focal cadet's leadership or management style.

Intercorrelations among the leadership and management styles scale scores were for the most part in the expected direction. A general pattern that emerged was that active forms of leadership tended to correlate positively with each other (eg. transformational and active management-by-exception).

Correlations among all of the antecedent measures are presented in Table 8. Correlations between each of the antecedent measures with subordinate ratings of leadership and management style at the first and second data collection periods are presented in Tables 9 and 10, respectively. Correlations among those antecedent measures collected at multiple time periods such as self-esteem, hardiness and physical fitness also are presented in each table.

As would be expected, several patterns in the correlations are worth noting. Antecedent measures of the same construct, collected over multiple time periods (e.g., hardiness, self-esteem, physical fitness) were generally positively correlated. Also, measures of conscientiousness, the leadership potential and social maturity indices were also positively intercorrelated. Both self-monitoring measures were correlated positively with measures of prior influence, leadership potential, moral development, self-esteem and the first hardiness score.

Several correlations presented in Tables 9 and 10 are also noteworthy, with respect to previous research findings. For example, the two measures of cognitive ability were each negatively correlated with ratings of transformational and contingent reward style leadership. Cognitive ability was positively correlated with active management-by-exception, and SAT math was positively related to passive management-by-exception. Confirming earlier research reported by Roush and Atwater (1992), sensing was positively correlated with transformational and contingent reward leadership styles, while negatively correlated with passive management-by-exception and laissez-faire leadership.

Table 5

Descriptive Statistics for Superior Leadership Ratings at Two Data Collection Periods

Superior Leadership Ratings	First Data Collection				Second Data Collection			
	M	SD	N	α	M	SD	N	α
Transformational	2.17	.79	145	.97	2.19	.66	125	.97
Contingent Reward	1.96	.86	162	.86	2.04	.83	137	.91
Contingent Punishment					2.18	.78	333	.86
Noncontingent Punishment					1.29	.93	317	.83
Management-by-Exception (Active)	1.84	.68	171	.75	1.78	.65	142	.75
Management-by-Exception (Passive)	1.80	.71	168	.75	1.67	.67	148	.76
Initiation of Structure					2.14	.74	322	.77
Consideration					2.30	.76	318	.78
Laissez-Faire	1.68	.80	184	.84	1.59	.85	165	.90

Note. Missing values indicate these survey measures were not collected at the first collection period.

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Table 6

Intercorrelations Among Superior Leadership Ratings - First Data Collection

	TF	CR	MBE-A	MBE-P	LF
Transformational (TF)	-----				
Contingent Reward (CR)	.85**	-----			
Management-by-Exception-Active (MBE-A)	.73**	.74**	-----		
Management-by-Exception-Passive (MBE-P)	-.16*	.04	.37**	-----	
Laissez-faire (LF)	-.28**	-.12	.18**	.79**	----

* p <.05
** p <.01

Note: Sample sizes for the leadership ratings are as follows: TF (n=159), CR (n=146), MBE-A (n=145), MBE-P (n=150), LF (n=165).

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Table 7

Intercorrelations Among Superior Leadership Ratings - Second Data Collection

	TF	CR	CP	NCP	MBE-A	MBE-P	IS	CS	LF
Transformational (TF)	----								
Contingent Reward (CR)	.84**	----							
Contingent Punishment (CP)	.11	.07	----						
Noncontingent Punishment (NCP)	.19*	.16	-.07	----					
Management-by-Exception-Active (MBE-A)	.62**	.62**	.05	.06	----				
Management-by-Exception-Passive (MBE-P)	-.36**	-.17*	.06	-.15	.05	----			
Initiating Structure (IS)	.18*	.17	.68**	-.13*	.08	.04	----		
Consideration (CS)	.12	.11	.35**	-.45**	.06	.15	.53**	----	
Laissez-faire (LF)	-.44**	-.21**	.00	-.09	.04	.76**	-.06	.09	----

* $p < .05$
** $p < .01$

Note: Sample sizes for the leadership ratings are as follows: TF (n=133), CR (n=124), CP (n=176), NCP (n=174), MBE-A (n=124), MBE-P (n=130), IS (n=173), CS (n=174), LF (n=134).

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Table 8

Intercorrelations Among Antecedent Measures

	SAT-V	SAT-M	BIO	RM	INFL	LOC	LPI	CON	SMI
SAT Verbal (SAT-V)	----								
SAT Math (SAT-M)	.46**	----							
BIOLEAD (BIO)	.15**	.06	----						
Role Model (RM)	-.26**	-.11	-.19**	----					
Prior Influence (INFL)	-.16**	-.09	.19**	.04	----				
Locus of Control (LOC)	-.15**	-.14**	-.13**	.02	-.10	----			
Leadership Potential Index (LPI)	.25**	.14**	.13**	-.14*	.26**	-.18**	----		
Conscientiousness (CON)	.25**	.13**	-.05	.04	-.02	-.39**	.51**	----	
Social Maturity Index (SMI)	.19**	.12*	-.08	.03	.05	-.16**	.64**	.61**	----
Moral Reasoning (MORAL)	.30**	.19**	.10	-.19**	-.03	-.17**	.16**	.13*	.07
Sensing (SENSE)	-.14**	-.09	-.06	.17**	.02	.01	-.07	.12*	-.04
Feeling (FEEL)	-.13**	-.14**	-.07	.13*	-.05	.15**	-.07	-.05	.10*

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Table 8 (continued)

<u>Intercorrelations Among Antecedent Measures</u>

	SAT-V	SAT-M	BIO	RM	INFL	LOC	LPI	CON	SMI
Self-Esteem 1 (SE-1)	-.04	.03	.07	-.03	.25**	-.19**	.34**	.25**	.10*
Self-Esteem 2 (SE-2)	.02	.03	.02	.19**	.20**	-.22**	.29**	.32**	.10
Self-Esteem 3 (SE-3)	-.10	-.06	.04	.11	.26**	-.27**	.29**	.27**	.16*
Hardiness 1 (HAR-1)	.11*	.04	.07	-.05	.17**	-.21**	.25**	.14-**	.10*
Hardiness 2 (HAR-2)	.01	.03	.08	.02	.26**	-.19**	.18**	.18**	.15**
Hardiness 3 (HAR-3)	-.03	-.10	.04	.17*	.13	-.13	.13	.19**	.07
Self-Monitoring-Control (SM-C)	.07	.07	.03	.04	.37**	-.06	.24**	.04	.13*
Self-Monitoring-Perception (SM-P)	.11	.07	.10	-.01	.36**	-.04	.15**	-.07	-.01
Physical Fitness 1 (FIT-1)	-.04	-.05	.06	-.03	.09	-.07	.11	.11	.08
Physical Fitness 2 (FIT-2)	-.01	.02	.09	-.03	.12	-.16**	.12*	.16**	.04
Physical Fitness 3 (FIT-3)	-.03	-.03	.12*	-.03	.15*	-.14*	.11	.14**	.07
Physical Fitness 4 (FIT-4)	-.03	-.07	.07	-.02	.14*	-.10	.08	.13**	.04

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Table 8 (continued)

Intercorrelations Among Antecedent Measures

	MORAL	SENSE	FEEL	SE-1	SE-2	SE-3
Moral Reasoning (MORAL)	----					
Sensing (SENSE)	-.09	----				
Feeling (FEEL)	-.09	-.17**	----			
Self-Esteem 1 (SE-1)	.16**	.01	-.06	----		
Self-Esteem 2 (SE-2)	-.01	.05	-.14*	.53**	----	
Self-Esteem 3 (SE-3)	.10	-.06	-.12	.53**	.59**	----
Hardiness 1 (HAR-1)	.09	-.11*	.05	.27**	.22**	.26**
Hardiness 2 (HAR-2)	.18**	-.04	.02	.26**	.16**	.24**
Hardiness 3 (HAR-3)	.00	.09	-.04	.18**	.27**	.26**
Self-Monitoring-Control (SM-C)	.16**	-.01	-.06	.23**	.23**	.23**
Self-Monitoring-Perception (SM-P)	.08	-.09	.02	.06	.12	.10
Physical Fitness 1 (FIT-1)	-.01	-.05	-.06	.09	.10	.13
Physical Fitness 2 (FIT-2)	-.01	.02	-.06	.07	.13	.15*
Physical Fitness 3 (FIT-3)	-.04	.00	-.06	.01	-.03	.07
Physical Fitness 4 (FIT-4)	-.04	-.02	-.04	.12	.10	.16*

Table 8 (continued)

Intercorrelations Among Antecedent Measures

	HAR-1	HAR-2	HAR-3	SM-C	SM-P	FIT-1	FIT-2	FIT-3	FIT-4
Hardiness 1 (HAR-1)	----								
Hardiness 2 (HAR-2)	.28**	----							
Hardiness 3 (HAR-3)	.17*	.32**	----						
Self-Monitoring-Control (SM-C)	.13*	.11	.03	----					
Self-Monitoring-Perception (SM-P)	.10	.11	.05	.48**	----				
Physical Fitness 1 (FIT-1)	.07	.01	.18*	.03	-.02	----			
Physical Fitness 2 (FIT-2)	.05	.01	.26**	.10	.02	.76**	----		
Physical Fitness 3 (FIT-3)	.03	.03	.15*	.04	-.04	.72**	.80**	----	
Physical Fitness 4 (FIT-4)	.11	.12	.20**	.10	.00	.66**	.75**	.79**	----

* $p < .05$
** $p < .01$

Note. Sample sizes for the antecedent measures are as follows: SAT-V (371), SAT-M (371), BIO (389), RM (274), INFL (275), LOC (401), LPI (403), CON (403), SMI (403), MORAL (353), SENSE (402), FEEL (402), SE-1 (391), SE-2 (261), SE-3 (210), HAR-1 (389), HAR-2 (264), HAR-3 (207), SM-C (274), SM-P (274), FIT-1 (280), FIT-2 (282), FIT-3 (286), FIT-4 (254).

Table 9

Correlations of Antecedent Measures with Subordinate Leadership Ratings--First Data Collection

Variable	TF	CR	CP	NCP	MBEA	MBEP	IS	CS	LF
SAT Verbal	-.17**	-.14*	-.03	-.10	.17**	.10	-.08	-.09	.03
SAT Math	-.15*	-.17**	-.04	-.07	.16**	.21**	-.01	-.06	.10
BIOLEAD	.03	.00	-.08	-.07	.11	-.21**	-.08	-.12*	-.15*
Conscientiousness	-.06	-.03	.01	-.14*	.10	-.07	.13*	.06	-.09
Locus of Control	.00	.02	.06	.11	.04	.07	.05	.15**	.06
Leadership Potential Index	-.10	-.07	.05	.04	.00	.04	.07	-.03	.03
Sensing	.19**	.19**	.10	.08	-.04	-.20**	.06	.04	-.12*
Feeling	-.08	.01	.10	.11	.08	.04	.00	-.08	.04
Social Maturity Index	-.09	-.05	.08	-.07	.06	.06	.07	.00	.02
Role Model	.10	-.03	-.12	.05	.08	.03	-.15*	-.17**	-.08
Prior Influence	.09	.05	.17**	-.06	.05	-.10	.20**	.13*	-.09
Moral Reasoning	-.04	.03	.02	.06	.02	.10	-.05	.03	-.06
Self-Esteem 1	-.02	.00	.00	.03	.06	.03	.02	-.07	.00
Self-Esteem 2	.00	.03	.10	.02	.03	-.26**	.06*	.02	-.12
Self-Esteem 3	-.01	.03	.02	.03	.09	-.04	.14*	-.04	-.03

Table 9 (continued)

Correlations of Antecedent Measures with Subordinate Leadership Ratings--First Data Collection

Variable	TF	CR	CP	NCP	MBEA	MBEP	IS	CS	LF
Hardiness 1	-.07	-.06	.05	-.03	.09	.00	.03	-.08	-.04
Hardiness 2	.00	.05	.19**	-.02	.02	-.08	.15*	-.02	-.02
Hardiness 3	.04	.05	.07	-.06	.12	-.14*	.13*	.01	-.11
Self-Monitoring (Control)	-.07	-.12	.07	.05	-.08	.06	.09	.11	.06
Self-Monitoring (Perception)	.02	.04	-.02	.01	-.01	.03	.05	.08	.02
Physical Fitness 1	.03	.07	.07	-.03	.12	-.09	.08	.05	-.07
Physical Fitness 2	.01	-.01	.10	-.01	.11	-.10	.08	.05	-.02
Physical Fitness 3	.09	.08	.13*	.01	.13*	-.15*	.13*	.07	-.05
Physical Fitness 4	-.03	-.05	.09	-.02	.20**	-.12	.13*	.04	-.01
Physical Fitness-Overall	.02	.03	.13*	.00	.16**	-.10	.13*	.07	-.02

*p < .05
**p < .01

Note. TF-Transformational; CR-Contingent Reward; CP-Contingent Punishment; NCP-Noncontingent Punishment; MBEA-Management-by-Exception-Active; MBEP-Management-by-Exception-Passive; IS-Initiating Structure; CS-Consideration; and LF-Laissez-Faire.

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An overall index of physical fitness was positively correlated with active and corrective styles of leadership such as contingent punishment and active management-by-exception, while also correlating positively with initiation of structure. Several of the individual time period measures of physical fitness exhibited a similar pattern of results.

It is interesting to note that prior influence experience for focal cadets was positively correlated with both contingent punishment, as well as ratings regarding initiating structure and consideration for the first data collection period. In the case of initiation of structure, one would expect to find focal cadet leaders who have had experience influencing others as those who would be more active initiators of structure in the current context.

Correlations for each of the antecedent measures with subordinate ratings of leadership and management styles are presented in Table 10 for the second collection of leadership measures. The pattern of results was similar to those reported above, with several exceptions. For example, overall physical fitness was correlated with contingent punishment at both times. Similar to the correlational patterns reported for the first collection period, the sensing scale from the MBTI was positively correlated with contingent reward leadership, but was not significantly related to ratings of transformational leadership. Relationships unique to the second data collection included significant correlations between physical fitness and transformational leadership and between hardiness and transformational and contingent reward leadership.

Shifting to superior ratings of leadership and management style, Table 11 presents the correlations between the various antecedent measures discussed above and superior leadership ratings from the first data collection. Generally, the correlations presented in Table 11 displayed a similar pattern to those correlations using subordinate ratings. SAT math and verbal scores were negatively correlated with ratings of transformational and contingent reward style leadership. The overall and component measures of physical fitness were generally positively correlated with active styles of leadership such as transformational, contingent reward and active management-by-exception. Physical fitness was negatively correlated with passive management-by-exception and laissez-faire styles of leadership. The BIOLEAD measure was also negatively correlated with ratings of contingent reward style leadership.

Correlations of superior ratings from the second administration of the MLQ (Form 5X) with the respective antecedent measures are presented in Table 12. Table 12 contains correlations with the management styles scales, which were not collected from superiors during the first administration.

Table 10

Correlations of Antecedent Measures with Subordinate Leadership Ratings--Second Data Collection

Variable	TF	CR	CP	NCP	MBEA	MBEP	IS	CS	LF
SAT Verbal	-.05	-.06	-.06	-.03	.11	.06	-.07	-.07	.10
SAT Math	-.15	-.18*	-.04	.10	.10	.15	-.04	-.14*	.23**
BIOLEAD	.01	-.03	.00	.03	-.11	-.16*	-.04	-.15*	-.22**
Conscientiousness	-.01	-.05	.01	-.06	.04	-.04	.01	.02	-.05
External Locus of Control	.03	.09	.11	.00	.00	.06	.06	.04	.00
Leadership Potential Index	-.06	-.11	.07	-.08	-.01	-.10	.04	.06	-.10
Sensing	.11	.24*	-.04	.10	.05	.04	.03	-.05	.00
Feeling	.05	-.04	-.01	.01	-.08	-.12	.02	.01	-.13
Social Maturity Index	.00	-.10	.00	-.10	.06	-.14	.04	.02	-.06
Role Model	-.13	-.04	-.10	.08	.02	.01	-.14*	-.05	.04
Prior Influence	.07	.04	.07	-.05	.02	-.13	-.04	-.04	-.14
Moral Reasoning	.07	.00	.10	.10	-.06	-.10	.02	-.12	-.18*
Self-Esteem 1	.11	.07	.10	-.14*	.04	-.09	.09	.10	-.01
Self-Esteem 2	.06	-.08	.03	-.04	-.08	-.08	-.02	-.10	.00
Self-Esteem 3	.13	.14	.03	-.08	.15	.02	.05	.02	.09

Table 10 (continued)

Correlations of Antecedent Measures with Subordinate Leadership Ratings--Second Data Collection

Variable	TF	CR	CP	NCP	MBEA	MBEP	IS	CS	LF
Hardiness 1	.23**	.08	-.03	.05	.05	-.03	-.08	-.11	.07
Hardiness 2	.15	-.01	-.02	.01	.08	-.15	.06	-.03	-.04
Hardiness 3	.37**	.29**	.05	-.05	.28**	-.05	.03	.02	.00
Self-Monitoring (Control)	.12	.08	.04	.15*	.10	-.06	-.02	.01	.05
Self-Monitoring (Perception)	-.01	-.09	.03	.17*	.09	-.09	-.01	.00	.00
Physical Fitness 1	.18*	.13	.15*	-.02	-.03	-.10	.10	.00	-.06
Physical Fitness 2	.12	.06	.10	.07	.01	-.01	.05	-.05	-.02
Physical Fitness 3	.15*	.13	.16*	.10	.11	-.01	.13*	-.01	-.02
Physical Fitness 4	.22**	.18*	.23**	.01	.12	-.02	.22**	.05	-.05
Physical Fitness-Overall	.21**	.15*	.17**	.02	.06	-.02	.15*	.02	-.05

*p < .05
**p < .01

Note. TF-Transformational; CR-Contingent Reward; CP-Contingent Punishment; NCP-Noncontingent Punishment; MBEA-Management-by-Exception-Active; MBEP-Management-by-Exception-Passive; IS-Initiating Structure; CS-Consideration; and LF-Laissez-Faire.

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Table 11

Correlations of Antecedent Measures with Superior Leadership Ratings–First Data Collection

Variable	TF	CR	MBEA	MBEP	LF
SAT Verbal	-.18*	-.19*	-.05	.01	.06
SAT Math	-.22**	-.15*	-.09	.01	-.05
BIOLEAD	-.07	-.20**	-.06	.00	-.09
Conscientiousness	.11	.06	.12	-.10	-.11
External Locus of Control	-.10	-.07	.00	.13	.13
Leadership Potential Index	-.02	.01	.11	.00	.00
Sensing	.09	.04	.07	-.01	-.10
Feeling	.00	-.06	-.05	-.07	-.01
Social Maturity Index	.01	.04	.10	-.01	.01
Role Model	.09	.13	.09	-.08	-.03
Prior Influence	.03	.00	.01	-.09	.12
Moral Reasoning	-.11	-.12	.02	.08	.10
Self-Esteem 1	-.01	.00	.00	-.16*	-.11
Self-Esteem 2	.03	.05	.10	-.04	.01
Self-Esteem 3	.09	.14	.17*	.08	.01

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Table 11 (continued)

Correlations of Antecedent Measures with Superior Leadership Ratings--First Data Collection

Variable	TF	CR	MBEA	MBEP	LF
Hardiness 1	.09	.16*	.13	.00	-.02
Hardiness 2	-.01	.00	-.01	-.01	.03
Hardiness 3	.09	.00	-.01	-.03	-.09
Self Monitoring (Control)	.03	-.06	.13	.07	.08
Self-Monitoring (Perception)	.03	-.01	.04	.03	.02
Physical Fitness 1	.18*	.11	.16*	-.15*	-.12
Physical Fitness 2	.20**	.09	.12	-.19*	-.17*
Physical Fitness 3	.27**	.21**	.18*	-.18*	-.17*
Physical Fitness 4	.23**	.18*	.21**	-.16*	-.10
Physical Fitness-Overall	.23**	.18*	.16*	-.23**	-.18**

*p < .05
**p < .01

Note. TF-Transformational; CR-Contingent Reward; CP-Contingent Punishment; NCP-Noncontingent Punishment; MBEA-Management-by-Exception-Active; MBEP-Management-by-Exception-Passive; IS-Initiating Structure; CS-Consideration; and LF-Laissez-Faire.

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In general, the pattern of correlations for the leadership scales were similar across the two administrations. Both measures of cognitive ability were negatively correlated with transformational and contingent reward style leadership, although for the SAT math, those relationships were not significant. The pattern of results for the BIOLEAD measure was similar to those reported in Table 11, except with superior ratings the negative correlation between BIOLEAD and transformational leadership was significant. Correlations of physical fitness with ratings of leadership and management style were in the same direction as those found with subordinate ratings, but not always significant. However, overall physical fitness did positively correlate with ratings of contingent reward, contingent punishment and initiation of structure.

Several other significant relationships emerged that were not found in previous analyses. For example, level of conscientiousness was negatively correlated with passive management-by-exceptionand positively correlated with initiation of structure. The Leadership Potential Index of the CPI was negatively correlated with passive management-by-exception, as well as laissez-faire style leadership. As expected, the prior influence experience scale was positively correlated with superior ratings of transformational leadership, while being negatively correlated with contingent punishment, passive-management-by-exception and laissez-faire leadership. Two measures of self-esteem were positively correlated with ratings of transformational leadership, while being negatively correlated with passive management-by-exception and laissez-faire style leadership.

Preliminary Tests of Causal Models

Separate hierarchical regression analyses were run to test the respective models presented in Figures 1 and 2, using as the dependent variables each leadership and management style scale. The entry of antecedent measures were blocked based on the time of data collection, as well as the expected causal ordering delineated in Figures 1 and 2. We conducted separate tests utilizing superior and subordinate ratings each collected in two separate time periods.

Some preliminary correlational analyses indicated there were relatively high degrees of multicollinearity among several of the predictors. Consequently, in some instances we combined measures into overall scales and/or eliminated several scales that had substantial overlap from these analyses. Specifically, we retained the Leadership Potential Index, but eliminated the CPI measures of conscientiousness and social maturity. For self-esteem and physical fitness we combined each of the measures collected over time into overall indices or scales. Levels of hardiness did not correlate as highly over time. Therefore, it was blocked and retained as three separate measures for inclusion in the hierarchical regression analyses.

Table 12

Correlations of Antecedent Measures with Superior Leadership Ratings--Second Data Collection

Variable	TF	CR	CP	NCP	MBEA	MBEP	IS	CS	LF
SAT Verbal	-.20*	-.17*	-.07	.06	-.12	.06	-.02	-.10	.02
SAT Math	-.09	-.06	-.11	.00	.03	.08	-.06	-.12	.03
BIOLEAD	-.20**	-.16*	-.02	-.06	-.06	.01	.05	-.01	-.02
Conscientiousness	.09	.08	.10	.03	-.02	-.16*	.15*	.08	-.10
External Locus of Control	-.12	-.10	-.13	-.05	.00	.11	-.03	.03	.07
Leadership Potential Index	.05	-.02	.08	.12	-.01	-.25**	-.07	-.09	-.23**
Sensing	.16*	.17*	.05	-.17*	.18*	.02	.03	.17**	.00
Feeling	-.02	.05	.19**	.00	.02	.15*	.20*	.06	.10
Social Maturity Index	.03	-.06	-.03	.14	-.06	-.18*	-.05	-.08	-.14
Role Model	.18*	.14	.06	.15*	.08	.08	.16*	.04	.01
Prior Influence	.20*	.05	-.20**	.01	.09	-.18*	-.12	-.11	-.21**
Moral Reasoning	.11	.06	-.14*	.07	.04	.02	-.09	.02	-.10
Self-Esteem 1	.20**	.04	.02	.08	.09	-.22**	-.05	.12	-.21**
Self-Esteem 2	.01	-.01	-.02	.10	-.04	-.08	-.02	-.06	-.10
Self-Esteem 3	.23**	.16	-.04	.14	.16	-.17*	-.07	-.06	-.08

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Table 12 (continued)

Correlations of Antecedent Measures with Superior Leadership Ratings--Second Data Collection

Variable	TF	CR	CP	NCP	MBEA	MBEP	IS	CS	LF
Hardiness 1	.09	.04	.26**	.13	.08	-.11	.15*	.01	-.14
Hardiness 2	.05	.00	.10	.02	.00	-.08	.11	.10	-.04
Hardiness 3	.11	.14	.03	.06	.14	.03	.20**	.11	.00
Self-Monitoring (Control)	-.01	-.16	-.05	.01	.01	.06	-.03	.03	-.03
Self-Monitoring (Perception)	.12	.08	-.16*	.00	.20*	.00	.01	.03	-.09
Physical Fitness 1	.15*	.17*	.08	.08	.13	-.13	.13	-.05	-.07
Physical Fitness 2	.03	.02	.10	.13	.08	-.05	.15*	-.11	-.01
Physical Fitness 3	.15*	.15*	.08	.10	.07	-.14	.16*	-.04	-.04
Physical Fitness 4	.11	.09	.14*	.07	.05	-.06	.20**	-.05	-.03
Physical Fitness-Overall	.13	.16*	.14*	.09	.12	-.09	.19**	-.04	-.01

*p < .05
**p < .01

Note. TF-Transformational; CR-Contingent Reward; CP-Contingent Punishment; NCP-Noncontingent Punishment; MBEA-Management-by-Exception-Active; MBEP-Management-by-Exception-Passive; IS-Initiating Structure; CS-Consideration; and LF-Laissez-Faire.

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Results presented in Tables 13a and 13b for subordinate ratings collected during the first administration of the MLQ (Form 5X) and management styles indicated that none of the overall regression equations were significant. The range of variance accounted for in either leadership and/or management styles was .17 for passive management-by-exception, through to .08 for noncontingent punishment. The sensing scale of the MBTI positively predicted contingent reward style leadership, while negatively predicting passive management-by-exception. Self-monitoring (control) negatively predicted ratings of contingent reward style leadership. Similarly, BIOLEAD had a negative relationship with passive management-by-exception, while measures of prior influence experience and role models had a positive relationship with initiation of structure.

The general pattern of results for these subordinate ratings indicated that most of the measures included in the first set of analyses added some variance to the prediction of either leadership and/or management style, and therefore we would argue that they should be retained in further research.

Moving to the first set of superior ratings in Tables 14a and 14b we noted that the range of variance accounted for was .10 for predicting passive management-by-exception, to .17 for predicting contingent reward style leadership. Similar to the correlational results, cognitive ability negatively predicted ratings of transformational leadership, but again the betas were not significant.

Generally, the pattern of results for many of the antecedent measures were in the expected direction. Yet, these patterns must be viewed with some caution given the lack of significance for each overall regression equation.

Hierarchical regression analyses are presented in Tables 15a and 15b for the second data collection of subordinate ratings. Across each of the leadership and management style measures, the range of variance accounted for was .26 for predicting transformational leadership, through to .06 for predicting initiation of structure. A significant regression equation was found for ratings of transformational leadership. Hardiness positively predicted transformational leadership ratings and accounted for a substantial increment in variance beyond measures of ability, experience, personality and moral reasoning. Measures of experience (e.g., BIOLEAD, Prior Influence and Role Model), moral reasoning, feeling and physical fitness were all in the expected direction, however, the betas for these measures were not significant.

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Table 13a

Hierarchical Regression Results for Subordinate Ratings of Leadership--First Data Collection

	TF			CR			MBEA			MBEP			LF		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
SAT Math	-.09	.03		-.14	.03		.11	.04		.21*	.04		.10	.01	.00
SAT Verbal	-.12			-.07			.12			.01			-.02		
Biolead	.03	.04	.01	.02	.04	.01	.07	.05	.01	-.23**	.10	.06	-.14	.04	.03
Prior Influence	.06			.01			.07			-.03			-.05		
Role Model	-.04			.07			-.03			-.09			.02		
Locus of Control	-.02	.05	.01	-.01	.04	.00	.08	.06	.01	.08	.11	.01	.06	.04	.00
Leadership Potential Index	-.10			-.04			-.08			.05			.06		
Moral Reasoning	.01	.05	.00	.10	.05	.01	-.04	.06	.00	.08	.11	.00	-.07	.05	.01

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Table 13a (continued)

Hierarchical Regression Results for Subordinate Ratings of Leadership--First Data Collection

	TF			CR			MBEA			MBEP			LF		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
Hardiness 1	-.06	.05	.00	-.06	.06	.01	.07	.10	.04	.05	.13	.02	-.02	.06	.01
Hardiness 2	-.01			.04			-.04			-.05			.05		
Hardiness 3	.05			.01			.14			-.07			-.11		
Self-Esteem	.00			.01			.08			-.06			-.01		
Sensing	.15	.08	.03	.17*	.08	.02	.01	.11	.01	-.18*	.16	.03	-.12	.07	.01
Feeling	-.05			.02			.13			.01			.00		
Self Monitoring-Control	-.11	.09	.01	-.21*	.11	.03	-.13	.13	.02	.07	.16	.00	.10	.08	.01
Self Monitoring-Perception	.06			.14			-.04			-.01			.00		
Physical Fitness (Overall)	.00	.09		.05	.12	.01	.09	.14	.01	-.07	.17	.01	-.01	.08	.00
F-Value	df (135) = .85			df (134) = 1.03			df (131) = 1.22			df (128) = 1.50			df (130) = .65		

*p < .05
**p < .01

Note.   TF-Transformational; CR-Contingent Reward; MBEA-Management-by-Exception-Active; MBEP-Management-by-Exception-Passive; and LF-Laissez-Faire.

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Table 13b

Hierarchical Regression Results for Subordinate Ratings of Management Styles--First Data Collection

	CP			NCP			IS			CS		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
SAT Math	-.03	.00		-.03	.01		-.02	.01		-.02	.01	
SAT Verbal	-.01			-.08			-.08			-.08		
Biolead	-.11	.05	.05	-.05	.02	.01	.21**	.08	.07	-.12	.06	.05
Prior Influence	.19*			-.07			.15			.15		
Role Model	.09			-.01			.17*			.14		
Locus of Control	.08	.06	.01	.10	.04	.02	.07	.09	.01	.15	.08	.02
Leadership Potential Index	.04			.12			.06			-.02		
Moral Reasoning	.06	.06	.00	.11	.05	.01	.09	.09	.00	.11	.09	.01

Table 13b (continued)

Hierarchical Regression Results for Subordinate Ratings of Management Styles--First Data Collection

	CP			NCP			IS			CS		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
Hardiness 1	.00	.09	.03	-.02	.05	.00	-.03	.11	.02	-.04	.11	.02
Hardiness 2	.17			.01			.11			-.03		
Hardiness 3	.01			-.07			.07			.02		
Self-Esteem	-.06			.08			.02			-.11		
Sensing	.11	.10	.01	.11	.07	.02	.02	.11	.00	-.03	.12	.01
Feeling	.10			.11			-.01			-.13		
Self Monitoring-Control	.04	.11	.01	.04	.07	.00	.01	.11	.00	.06	.13	.01
Self Monitoring-Perception	-.10			.03			-.02			.04		
Physical Fitness (Overall)	.14	.13	.02	.06	.08	.01	.11	.12	.01	.10	.14	.01
F-Value	df (139) = 1.19			df (138) = .69			df (140) = 1.09			df (140) = 1.30		

*$p < .05$
**$p < .01$

Note. CP-Contingent Punishment; NCP-Noncontingent Punishment; IS-Initiating Structure and CS-Consideration.

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Table 14

Hierarchical Regression Results for Superior Ratings of Leadership--First Data Collection

Variables	TF			CR			MBEA			MBEP			LF		
	ß	R²	ΔR²	ß	R²	ΔR²	ß	R²	ΔR²	ß	R²	ΔR²	ß	R²	ΔR²
SAT Math	-.17	.05		-.08	.04		-.09	.01		.01	.00		-.07	.00	
SAT Verbal	-.10			-.15			-.01			.00			.04		
Biolead	-.04	.06	.01	-.17	.07	.03	-.04	.02	.01	.00	.01	.01	-.08	.02	.02
Prior Influence	.01			.00			.01			-.09			-.10		
Role Model	.04			.06			.07			-.08			-.04		
Locus of Control	-.14	.08	.02	-.12	.09	.02	.01	.04	.02	.13	.03	.02	.11	.04	.02
Leadership Potential Index	-.02			.07			.16			.04			.05		
Moral Reasoning	-.06	.08	.00	-.07	.10	.01	.05	.04	.00	.09	.04	.01	.12	.05	.01

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Table 14 (continued)

Hierarchical Regression Results for Superior Ratings of Leadership--First Data Collection

Variables	TF			CR			MBEA			MBEP			LF		
	β	R²	ΔR²	β	R²	ΔR²	β	R²	ΔR²	β	R²	ΔR²	β	R²	ΔR²
Hardiness 1	.09	.09	.01	.18	.13	.03	.12	.06	.02	.03	.04	.00	.00	.06	.01
Hardiness 2	-.06			-.02			-.05			.02			.09		
Hardiness 3	.05			-.06			-.07			.00			-.10		
Self-Esteem	.01			.02			.08			-.04			.01		
Sensing	.05	.10	.01	.01	.14	.01	.06	.07	.01	-.01	.05	.01	-.10	.07	.01
Feeling	-.02			-.13			-.07			-.10			-.07		
Self Monitoring-Control	.04	.10	.00	-.11	.15	.01	.10	.08	.01	.10	.06	.01	.12	.09	.02
Self Monitoring-Perception	.06			.08			.03			.03			.03		
Physical Fitness (Overall)	.17	.13	.03	.14	.17	.02	.17	.11	.03	-.21	.10	.04	-.13	.10	.01
F-Value	df(97) = .83			df(86) = 1.05			df(84) = .60			df(89) = .56			df(101) = .66		

Note. TF-Transformational; CR-Contingent Reward; MBEA-Management-by-Exception-Active; MBEP-Management-by-Exception-Passive; and LF-Laissez-Faire.

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Table 15a

Hierarchical Regression Results for Subordinate Ratings of Leadership--Second Data Collection

	TF			CR			MBEA			MBEP			LF		
	β	R²	ΔR²	β	R²	ΔR²	β	R²	ΔR²	β	R²	ΔR²	β	R²	ΔR²
SAT Math	-.16	.02		-.20	.03		.06	.01		.15	.02		.23*	.05	
SAT Verbal	.02			.03			.07			-.01			-.01		
BIOLEAD	.02	.04	.02	-.03	.04	.01	-.16	.04	.03	-.16	.06	.04	-.24*	.12	.07
Prior Influence	.06			.03			.08			-.09			-.07		
Role Model	.14			.01			-.07			-.07			-.12		
Locus of Control	.02	.05	.01	.06	.05	.01	.00	.04	.00	.04	.07	.01	-.11	.14	.02
Leadership Potential Index	-.06			-.10			-.06			-.09					
Moral Reasoning	.13	.06	.01	.06	.05	.00	-.10	.05	.01	-.13	.09	.02	-.25*	.19	.05

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Table 15a (continued)

Hierarchical Regression Results for Subordinate Ratings of Leadership--Second Data Collection

	TF			CR			MBEA			MBEP			LF		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
Hardiness 1	.22*	.22	.16	.10	.16	.11	.01	.16	.11	.03	.10	.01	.10	.22	.03
Hardiness 2	.00			-.12			.01			-.11			-.01		
Hardiness 3	.33**			.32**			.33**			.03			.05		
Self-Esteem	.01			.01			.01			.06			-.12		
Sensing	.09	.23	.01	.21	.20	.04	.04	.16	.00	.03	.11	.01	.00	.23	.01
Feeling	.03			-.02			-.04			-.11			-.11		
Self Monitoring-Control	.16	.25	.02	.18	.23	.03	.10	.17	.01	.00	.11	.00	.12	.24	.01
Self Monitoring-Perception	-.09			-.16			.05			-.03			.03		
Physical Fitness (Overall)	.13	.26	.01	.06	.23	.00	-.08	.18	.01	-.06	.12	.01	-.06	.25	.01
F-Value	df (74) = 1.57*			df (69) = 1.20			df (70) = .89			df (73) = .56			df (75) = 1.45		

*p < .05
**p < .01

<u>Note.</u> TF-Transformational; CR-Contingent Reward; MBEA-Management-by-Exception-Active; MBEP-Management-by-Exception-Passive; and LF-Laissez-Faire.

Table 15b

Hierarchical Regression Results for Subordinate Ratings of Management Styles--Second Data Collection

	CP			NCP			IS			CS		
	ß	R^2	ΔR^2	ß	R^2	ΔR^2	ß	R^2	ΔR^2	ß	R^2	ΔR^2
SAT Math	-.01	.00		.15	.02		-.01	.00		-.14	.02	.02
SAT Verbal	-.05			-.10			-.06			-.01		
BIOLEAD	.01	.02	.02	.05	.02		-.02	.01	.01	-.14	.04	.02
Prior Influence	.06			-.06			-.05			-.02		
Role Model	.09			.00			.03			.00		
Locus of Control	.13	.04	.02	.00	.03	.01	.05	.02	.01	.12	.05	.01
Leadership Potential Index	.10			-.08			.10					
Moral Reasoning	.15	.06	.02	.12	.04	.01	.05	.02	.00	-.10	.06	.01

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Table 15b (continued)

Hierarchical Regression Results for Subordinate Ratings of Management Styles--Second Data Collection

	CP			NCP			IS			CS		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
Hardiness 1	-.04	.07	.01	.10	.06	.02	-.11	.04	.02	-.14	.07	.01
Hardiness 2	-.07			.01			.09			.02		
Hardiness 3	.04			-.01			.00			.01		
Self-Esteem	.05			-.12			.05			.12		
Sensing	-.07	.07	.00	.12	.07	.01	.01	.04	.00	-.09	.08	.01
Feeling	-.04			.02			.01			-.02		
Self Monitoring-Control	-.03	.07	.00	.15	.14	.07	-.04	.04	.00	.02	.09	.01
Self Monitoring-Perception	.01			.19			.04			.04		
Physical Fitness (Overall)	.17	.10	.03	.03	.14	.00	.14	.06	.02	-.01	.09	.01
F-Value	df (110) = .69			df (106) = .99			df (107) = .37			df (108) = .60		

*p < .05
**p < .01

Note. CP-Contingent Punishment; NCP-Noncontingent Punishment; IS-Initiating Structure and CS-Consideration.

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Several interesting results emerged from the analyses which included laissez-faire leadership as the dependent measure. Specifically, SAT math was positively associated with this measure of inactive leadership, whereas, experience assessed via the BIOLEAD scale and moral reasoning were each negatively associated with ratings of laissez-faire leadership.

Results presented for the second data collection of the superior ratings in Table 16 produced several significant and marginally significant (p <.10) regression equations, including the prediction of transformational leadership, contingent punishment and initiation of structure. For transformational leadership, the measure of prior influence experience positively predicted transformational leadership, while BIOLEAD displayed a significant negative relationship with ratings of transformational leadership.

The regression equation for predicting contingent punishment also was significant. Prior influence experience in leadership roles was negatively related to this management style, while also being negatively related to ratings of laissez-faire leadership. Leaders who were seen by superiors as exhibiting contingent punishment viewed themselves as being higher on internal locus of control. The first measure of hardiness positively predicted superior ratings of contingent punishment. Other measures such as the overall physical fitness index were positively associated with ratings of contingent punishment, however, these relationships were not significant.

The overall regression equation for initiation of structure was significant, demonstrating a significant positive relationship with role modelling. Other results that were not significant, but in the expected direction, included positive relationships for hardiness and overall physical fitness.

An interesting pattern emerged across the results reported for the two data collection periods. Generally, the effect sizes for each of the respective regression equations were higher for the second data collection period compared to the first, for both superior and subordinate ratings of leadership and management style. For example, in the first period, the range of total variance accounted for was between 8 and 17 percent. For the second data collection, the range of total variance accounted for was between 6 and 26 percent. This pattern lends some credence to our earlier argument that as focal cadets move into more formal leadership roles, we may be able to better estimate their performance in those respective roles.

Table 16a

Hierarchical Regression Results for Superior Ratings of Leadership--Second Data Collection

	TF			CR			MBEA			MBEP			LF		
	β	R²	ΔR²	β	R²	ΔR²	β	R²	ΔR²	β	R²	ΔR²	β	R²	ΔR²
SAT Math	.00	.04		.02	.03		.10	.02		.07	.01		.02	.01	
SAT Verbal	-.19			-.18			-.16			.03			.01		
BIOLEAD	-.21*	.12	.08	-.14	.05	.02	-.06	.03	.01	.06	.05	.04	.03	.05	.04
Prior Influence	.22*			.06			.09			-.19			-.22*		
Role Model	.10			.08			.04			.11			.02		
Locus of Control	-.15	.15	.03	-.14	.07	.02	-.01	.03	.00	.09	.11	.06	.03	.08	.03
Leadership Potential Index	.05			.01			.00			-.24*			-.20		
Moral Reasoning	.19	.18	.03	.12	.09	.02	.09	.04	.01	.04	.11	.00	-.10	.09	.01

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Table 16a (continued)

Hierarchical Regression Results for Superior Ratings of Leadership--Second Data Collection

	TF			CR			MBEA			MBEP			LF		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
Hardiness 1	.07	.19	.01	.05	.11	.02	.09	.07	.03	-.02	.13	.02	-.08	.11	.02
Hardiness 2	-.09			-.10			-.11			-.04			.07		
Hardiness 3	.06			.15			.16			.12			.05		
Self-Esteem	.00			-.07			.00			-.11			-.04		
Sensing	.12	.20	.01	.14	.13	.02	.17	.10	.03	.04	.15	.02	.00	.11	.00
Feeling	.00			.07			.06			.15			.10		
Self Monitoring-Control	-.22	.24	.04	-.32*	.21	.08	-.15	.16	.06	.22	.18	.03	.17	.13	.02
Self Monitoring-Perception	.18			.24			.28*			-.03			-.08		
Physical Fitness (Overall)	.13	.26	.02	.15	.23	.02	.14	.17	.01	-.04	.19	.01	.00	.13	.00
F-Value	df (78) = 1.59*			df (71) = 1.22			df (71) = .88			df (76) = 1.02			df (78) = .71		

*p < .10
**p < .05

Note. TF-Transformational; CR-Contingent Reward; MBEA-Management-by-Exception-Active; MBEP-Management-by-Exception-Passive; and LF-Laissez-Faire.

Table 16b

Hierarchical Regression Results for Superior Ratings of Management Styles--Second Data Collection

	CP			NCP			IS			CS		
	β	R²	ΔR²	β	R²	ΔR²	β	R²	ΔR²	β	R²	ΔR²
SAT Math	-.10	.01		-.03	.00		-.06	.00		-.09	.02	.02
SAT Verbal	-.02			.07			.01			-.06		
BIOLEAD	.05	.06	.05	-.05	.04	.04	.12	.06	.06	.04	.03	.01
Prior Influence	-.23**			.03			-.15			-.14		
Role Model	.06			.17			.18*			.02		
Locus of Control	-.18*	.09	.03	-.03	.05	.01	-.05	.06	.00	-.01	.03	.00
Leadership Potential Index	-.01			.14			-.02			-.02		
Moral Reasoning	-.14	.11	.02	.07	.06	.01	-.08	.06	.00	.06	.04	.01

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Table 16b (continued)

Hierarchical Regression Results for Superior Ratings of Management Styles--Second Data Collection

	CP			NCP			IS			CS		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
Hardiness 1	.29**	.21	.10	.10	.07	.01	.18	.14	.08	.01	.06	.02
Hardiness 2	.14			-.05			.10			.11		
Hardiness 3	-.06			.00			.17			.09		
Self-Esteem	-.02			.07			-.12			.01		
Sensing	.09	.24	.03	-.19*	.11	.04	.05	.17	.03	.17	.09	.03
Feeling	.16			-.05			.17			.07		
Self Monitoring-Control	.13	.25	.01	-.07	.11	.00	.07	.17	.00	.08	.11	.02
Self Monitoring-Perception	-.13			-.01			.01			.09		
Physical Fitness (Overall)	.14	.27	.02	.08	.12	.01	.15	.19	.02	-.05	.11	.00
F-Value	df (109) = 2.39**			df (108) = .84			df (107) = 1.51*			df (108) = .77		

*$p < .10$
**$p < .05$

Note. CP-Contingent Punishment; NCP-Noncontingent Punishment; IS-Initiating Structure; and CS-Consideration.

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LISREL Tests of Substantive Causal Models

Moving to the LISREL tests of the causal models, Table 17 presents a listing of the key constructs included in these analyses. Also, for each construct we specify the number of final items included and where appropriate, a representative sample item.

Again, due to small n-sizes relative to the number of variables included in each of the causal model tests, it was necessary to reduce the number of items representing each of the various latent constructs comprising the model. Specifically, we did not import the scales used in earlier analyses, which requires that we assume they contain no measurement error. Rather, we tested item loadings on each of the various latent constructs, while also examining how well each construct predicted transformational versus laissez-faire leadership. To reduce the number of items, we systematically selected items with the highest loadings on each respective construct based on prior confirmatory factor analysis results. This procedure was used until we achieved an acceptable minimum level of fit for the causal model.

A general summary of results from the LISREL analyses is presented in Table 18. It is important to note that these results were based on a reduced set of items and measurement constructs. Specifically, these results are based on several iterations of testing a causal model for predicting leadership ratings collected from superior and subordinate raters over two separate time periods. We assessed the proposed model by using maximum likelihood estimation procedures included in LISREL 7 (Joreskog & Sorbom, 1989). The causal modelling routines were based on the inclusion of correlational matrices in the LISREL 7 program.

The fit indices presented in Table 18 for each of three respective causal models indicated that there was an acceptable but not outstanding fit established for both superior and subordinate ratings of leadership style. For superior ratings at the first data collection period, or Model I, χ^2 (224, df=756) = 1312, $p < .001$, Goodness of Fit Index (GFI) = .81, Adjusted Goodness of Fit Index (AGFI) = .76 and Root Mean Square Residual (RMSR) = .06. Conventional cut-offs for the GFI = .90, and for the Root Mean Square Residual Value = .05. Therefore, the fit was not optimal for superior ratings of transformational contrasted with laissez-faire leadership. Since prior research suggests that eliminating nonsignificant paths can result in models that are unstable in cross-validation, we chose here to retain all paths included in the base model, whether they were significant or not.

The fit indices for Model II, which included subordinate ratings collected during the same time period as the dependent measure were slightly better than those reported for Model I. For subordinate ratings χ^2 (224, df = 756) = 1173, $p < .001$, GFI = .83, AGFI = .78 and RMSR = .06. Again, although the fit indices were acceptable, the overall model fit was not optimal.

Table 17

Summary of Items and Constructs Included in the Test of the Causal Models

| Construct	Number of Items	Item Example
Cognitive Ability	2	SAT Math/Verbal Scores
BIOLEAD	1	Derived from ABLE Survey
Conscientiousness	4	Derived from CPI Survey
Role Model	2	How would you describe your mother (father) as a parent? Higher scores represent a more favorable role model (1=low; 2=high)
Leadership Potential Index	1	Derived from CPI Survey
Physical Fitness 1 & 2	2	VMI Physical Fitness Test Score
External Locus of Control	1	Derived from Rotter's Locus of Control Scale
Self-Esteem 1, 2 & 3	3	I feel that I have a number of good qualities; I am able to do things as well as most other people; and on the whole I am satisfied with myself
Hardiness 1, 2 & 3	3	It bothers me when something unexpected interrupts my daily routine; I don't like things to be uncertain or unpredictable; and changes in routine bother me
Transformational Leadership	5	Instills pride in what I do
Laissez-Faire Leadership	5	Takes no action even when problems become chronic

The fit indices for Model III were similar in magnitude to Model I. Model III included the second administration of supervisor ratings of transformational and laissez-faire leadership. The fit indices were χ^2 (224, df = 769) = 1544, p < .001, GFI = .80, AGFI = .75 and RMSR = .06. Again, the model fit was less than optimal. Results concerning the second administration of the subordinate ratings were not presented here because they fell below acceptable levels of fit, with GFI equal to .77, RMSR = .06.

Table 18

Summary of Results for Causal Models Using Two Rater Sources at Two Points in Time

Rater Source		Fit Indices		
	Chi-Square Results	GFI	AGFI	RMSR
1. Superior Ratings (First)	χ^2(224,df=756)=1312, p<.001	.81	.76	.06
2. Subordinate Ratings (First)	χ^2(224,df=756)=1173, p<.001	.83	.78	.06
3. Superior Ratings (Second)	χ^2(224,df=769)=1544, p<.001	.80	.75	.06

Several of the relationships specified in each of three models, and presented in Figures 3 and 4 are worth highlighting (values in parentheses in Figures 3, 4 and 5 represent path coefficients and the asterisks represent the significance value, $p \leq .01$). For example, with the first administration of superior ratings cognitive ability negatively predicted ratings of transformational leadership, while positively predicting laissez-faire leadership. However, this same pattern of results did not hold-up in the causal relationships presented for the second data collection period. Physical fitness positively predicted transformational leadership during the first administration, but not ratings of transformational leadership collected during the second administration. In general, for measures collected over multiple time periods such as self-esteem, hardiness and physical fitness, each exhibited a positive relationship with itself over time. Self-esteem 3 positively predicted laissez-faire leadership.
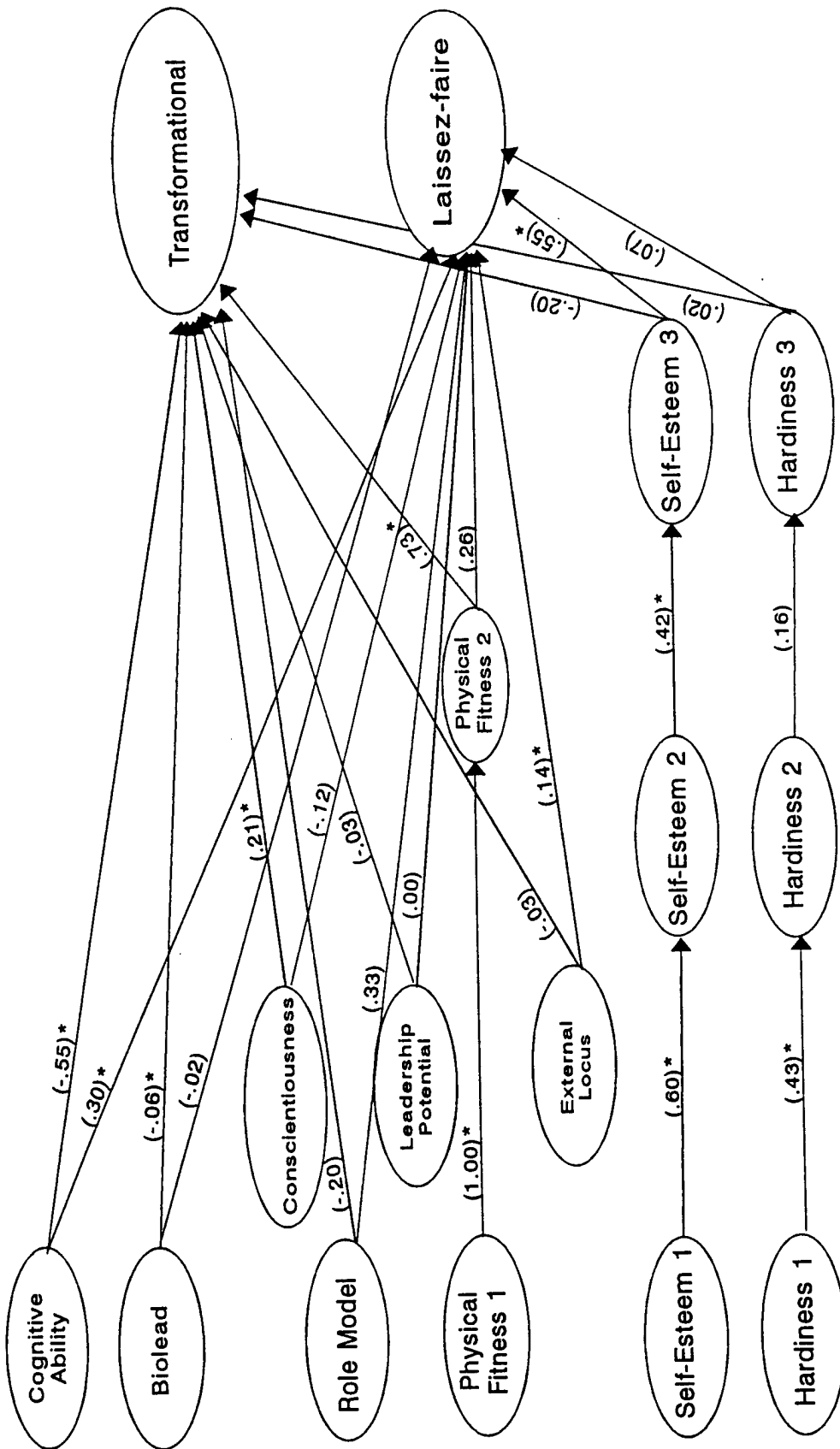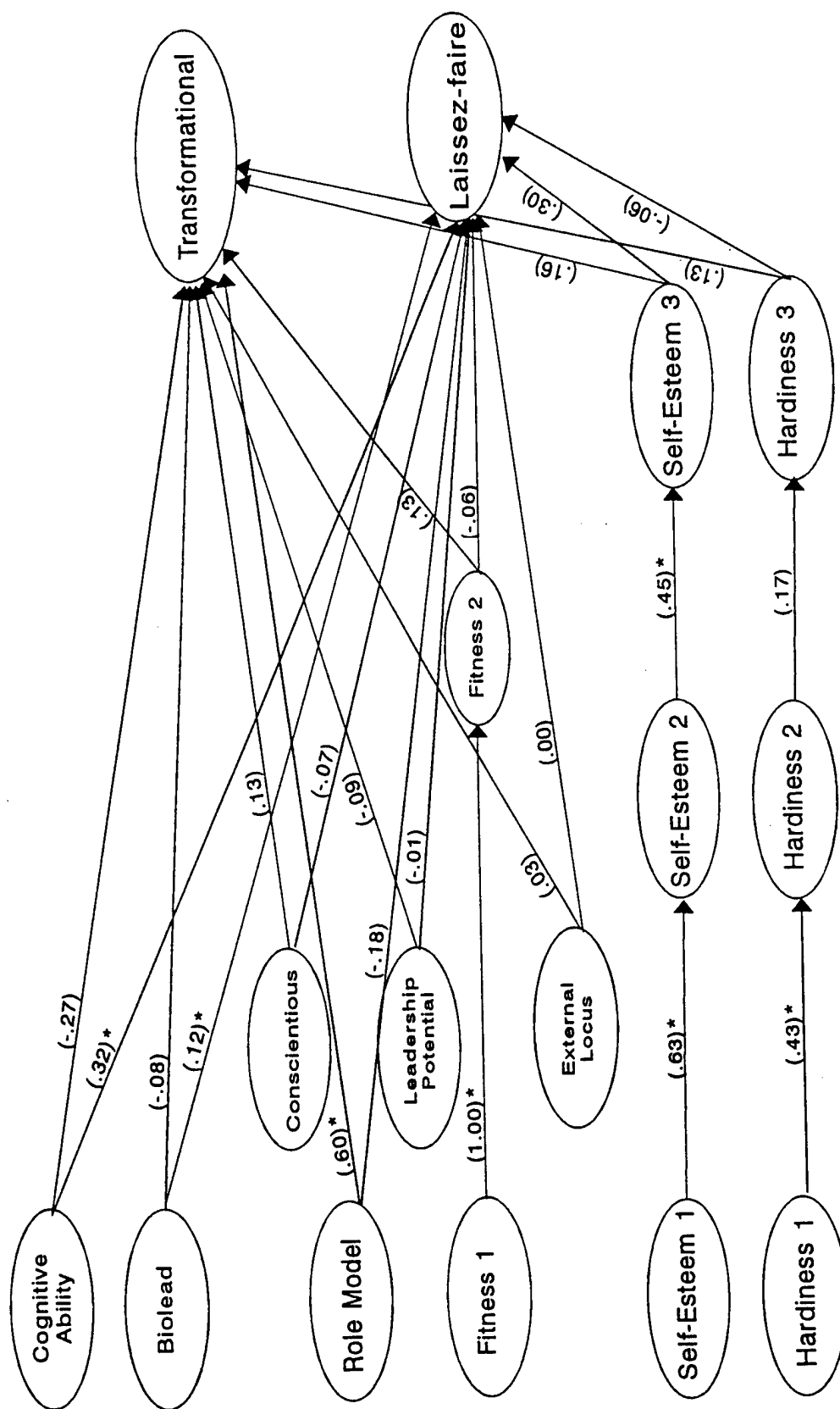
Figure 3 - Antecedent Measures Predicting Superior Ratings
(First Data Collection Period, 92-93)
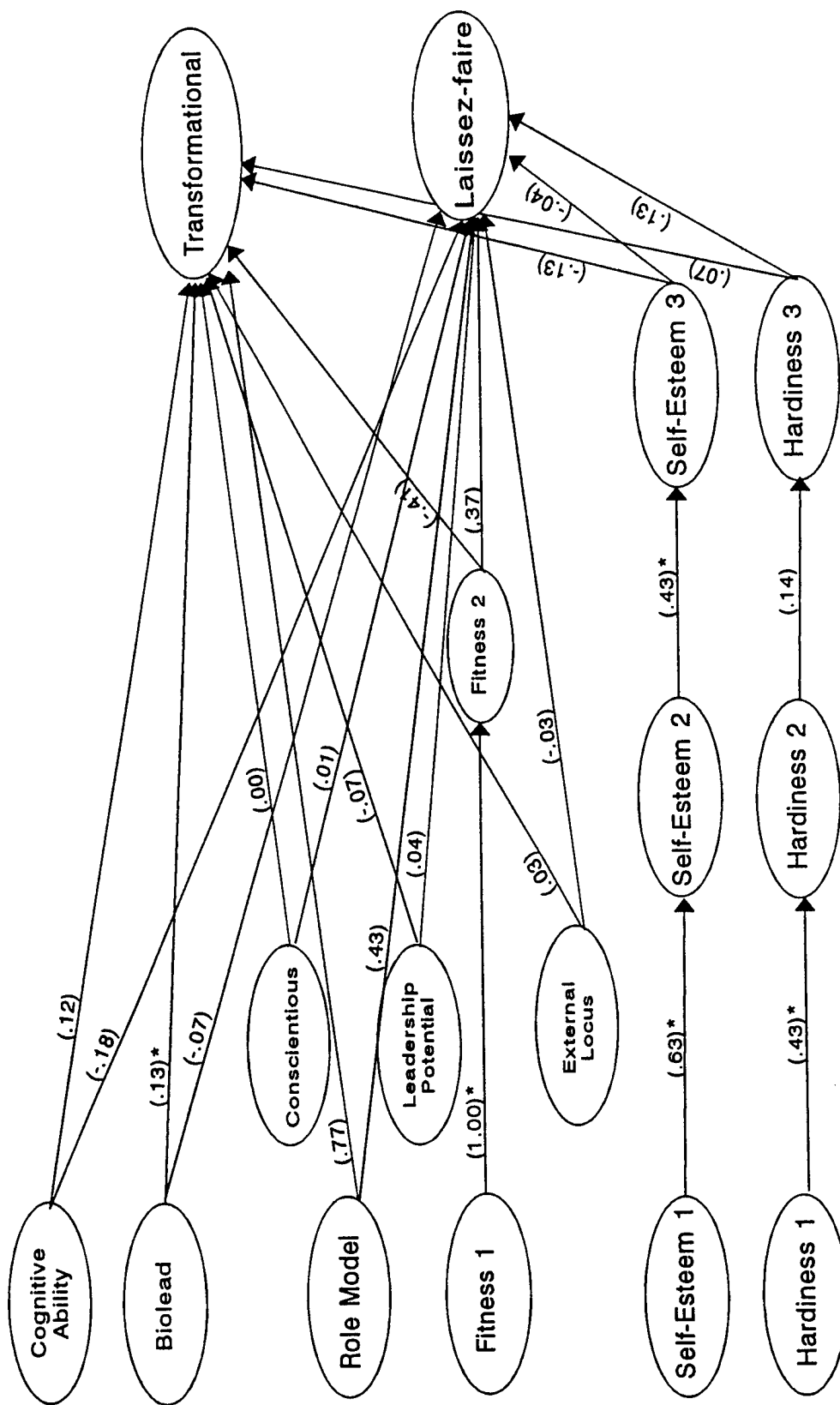
Note. *p < .01

Figure 4 - Antecedent Measures Predicting Superior Ratings
(Second Data Collection Period, 93-94)

Note. *p < .01

Figure 5 - Antecedent Measures Predicting Subordinate Ratings
(First Data Collection Period, 92-93)

Note. *p < .01

Turning to the subordinate ratings included in Model II, the pattern of relationships for cognitive ability was similar to those reported for superior ratings. Role modelling was positively related to transformational leadership, while physical fitness did not significantly predict either transformational or laissez-faire leadership ratings. As with the earlier models, self-esteem and hardiness measures generally had positive associations with themselves over time, as did the measures of physical fitness.

Since the current study began in 1991 a number of cadets have left the institute. Thus, some of the developmental patterns presented in the LISREL analyses might be affected by differential dropout rates of focal cadets. Thus, the LISREL analyses were rerun for both superior and subordinate ratings including only those focal cadets who have remained at VMI since the 1991 orientation session.

The pattern of path coefficients for the sample of cadets who remained at VMI was similar to the LISREL results presented for the entire group of focal cadets. For subordinate ratings, the path coefficients were similar for most variables except role model which showed the biggest change from a significant (.60) to a non-significant path coefficient (-.09). All other path coefficients remained the same in terms of sign and significance levels for superior ratings.

For subordinate ratings one relationship, self-esteem 3 to laissez-faire leadership, was significantly affected by attrition. The new path coefficient remained in the expected direction, but fell slightly below significance level. This change from significance to nonsignificance may be attributed to a decrease of 24 cadets from self-esteem 2 measures (226 cadet scores) to self-esteem 3 measures (202 cadet scores).

Finally, the estimates of model fit were similar to the overall sample. For subordinate ratings the GFI of .82; AGFI of .77 and RMSR of .06 were virtually unchanged. For superior ratings the GFI of .80, AGFI of .75, and RMSR of .06 were also similar to the original estimates of model fit. In sum, the results of the LISREL analyses, using only the sample of cadets who remained at VMI from 1991-1994, indicated that the results for subordinate and superior ratings were generally unchanged from the nonattrited findings produced with the sample included at time period 1.

Due to some of the problems noted above regarding multicollinearity, we decided to use a less stringent analysis to look-at some of the differences in antecedent measures comparing focal cadet leadership and management style constructs. In Tables 19 through 21, we have provided a summary of significant results from a series of mean-test comparisons for ratings of focal cadets collected over the two data collection periods. Although we report only significant effects all of the aforementioned variables were included in these mean-test comparisons. Additionally, we also have examined in Tables 22 and 23 how changes in leadership over the two data collections relate to the antecedent measures.`

Subgroup Analyses of "Top" vs. "Bottom" Rated Leaders

Essentially, for each of the analyses reported in Tables 19 through 23 we computed the means on the respective leadership and management styles measures, and then selected those focal cadet leaders who were either above the mean as our top group, versus those who were below the mean on these measures as our bottom group. The basis for these groupings comes from earlier literature (Bass & Avolio, 1990), that has shown that transformational leaders typically are more active and constructive in their interactions with followers, rather than either inactive, corrective and/or punitive. In the current sample, for both superior and subordinate ratings, transformational leadership was significantly negatively correlated with laissez-faire ratings. Noncontingent and contingent punishment were each uncorrelated, or negatively correlated, with transformational leadership ratings for both superior and subordinate ratings.

Thus, in Table 19, we grouped the focal cadet leaders who were rated both below the mean on transformational leadership and above the mean in using contingent punishment. This group of leaders was contrasted with focal cadets showing the opposite pattern on transformational leadership and contingent punishment. In Table 20 we created similar groupings for transformational leadership, coupling it with low versus high rated noncontingent punishment. In Table 21 we coupled more highly rated transformational leaders who were also rated low on laissez-faire leadership, and compared that group to focal cadets who had received lower ratings on transformational leadership and higher ratings on laissez-faire leadership.

In evaluating subordinate ratings reported in Tables 19, 20 and 21 at the first data collection period, some sample overlaps were evident in both the high and low transformational conditions. Specifically, 15% of the low transformational leaders in the sample possessed high scores for contingent punishment, noncontingent punishment, and laissez-faire. That is to say that 15% of the focal cadets rated as low transformational leaders by subordinates at time 1 were engaging in all three styles. Thirty-one percent of the focals rated as low transformational by subordinates at time 1 were engaging in two of these three leadership/management styles, and 54% of the focals rated as low transformational were engaging in only one of the three styles.

In the high transformational condition as rated by subordinates at time 1, 9% of the high transformational leaders possessed low scores for all three of these styles. That is to say that these focal cadets were not actively engaging in any contingent punishment, noncontingent punishment or laissez-faire behavior. Twenty-eight percent of the focals rated as high transformational by subordinates at time 1 possessed low scores on two of these three styles, and 63% of the focals rated as high transformational possessed a low score on only one of these three styles.

Subordinate ratings at the second data collection period were somewhat similar regarding sample overlaps. In the low transformational leadership sample, 12%

possessed high scores for all three styles, 22% were rated high for two of the three styles, and 66% were rated high on only one of the three styles. In the high transformational sample, two percent were rated low for all three styles, 31% were rated low on two of the three styles, and 67% were rated low on only one of the three styles.

Superior ratings at the second data collection period also produced some sample overlaps in both the low and high transformational conditions. In the low transformational sample, 3% possessed high scores for all three styles, 36% were rated high on two of the three styles, and 61% were rated high on only one of these three styles. In the high transformational sample, 10% possessed low scores for all three styles, 45% were rated low on two of the three styles, and 45% were rated low on only one of the styles.

Based on subordinate ratings, transformational leaders who were rated as using contingent punishment less often over time had lower mean scores on the Leadership Potential Index, Social Maturity and hardiness 2, while displaying significantly higher SAT math and hardiness 1 and 3 scores for leadership and management style ratings, collected during the second administration. For superior ratings, only role modelling and self-monitoring (perception) displayed significant mean differences. Leaders evaluated higher on transformational leadership evaluated themselves higher on the perceiving subscale of the self-monitoring measure, and indicated having less desirable role models for parents.

Moving to Table 20, we grouped transformational and nontransformational leaders based on their use of noncontingent punishment. As noted earlier, the management styles survey was not administered to superiors during the first data collection period, and therefore, there are no results provided for these scales in either Table 20 or 21.

Table 19

Comparison of Mean Differences Between Low Transformational, High Contingent Punishment and High Transformational, Low Contingent Punishment Groups for the First and Second Data Collection Period.

Variables	Low Transformational, High Contingent Punishment			High Transformational, Low Contingent Punishment			Variance Estimate	
	M	SD	N	M	SD	N	T-value	df
Subordinate--First								
Leadership Potential Index	50.52	5.61	34	47.83	4.21	34	2.23**	66
Social Maturity Index	49.06	3.09	34	47.11	3.57	34	2.41**	66
Hardiness 2	7.31	.72	32	6.34	1.44	26	3.32**	56
Subordinate--Second								
SAT Math	555.17	60.27	29	524.50	63.94	20	1.71**	47
Hardiness 1	6.79	1.38	30	7.48	7.48	23	-2.02*	51
Hardiness 3	6.66	1.25	26	7.33	1.01	15	-1.77*	39
Superior--Second								
Role Model	3.69	1.18	13	2.96	.85	15	1.88*	26
Self-Monitoring-Perception	3.35	.40	13	3.67	.49	15	-1.86*	26

*$p < .05$
**$p < .01$

Note. The cut-offs for low versus high transformational leadership were 2.05 for subordinate ratings for the first data collection periods, and 2.20 for the second data collection period. The cut-offs for superior ratings of transformational leadership were 2.17 and 2.19 in the first and second data collections, respectively. Cut-offs for contingent punishment were as follows; for subordinate ratings in the first data collection--1.88 and second--1.87; for superior ratings the cut-off was 2.18 in the second data collection period.

Based on subordinate ratings at the first administration, the higher rated transformational leaders had a lower mean Leader Potential Index score, a lower SAT math score and a higher score on the prior influence experience measure. Similar to results presented in Table 19 for subordinate ratings collected during the second administration, the transformational rated leaders who used noncontingent punishment less often had higher mean scores on hardiness 1 and 3. In addition, these leaders had lower scores on self-monitoring (perception), and a higher score on physical fitness 4.

Results for superior ratings for the second data collection were similar to those reported for subordinate ratings, with the addition of a significant mean difference on self-monitoring (control).

In Table 21 we compared transformational versus nontransformational leaders coupled with low versus high laissez-faire ratings generated by subordinate and superiors over the two data collection periods. Similar to our earlier results, transformational leaders who exhibited laissez-faire leadership less often during the first data collection had significantly higher mean scores on hardiness 3 and lower scores on self-monitoring (control) for subordinate ratings. They also had lower scores on SAT-Math and higher scores on the MBTI sensing scale. At the second administration, leaders rated more transformational exhibited higher hardiness 1, 2 and 3 scores, and higher scores on physical fitness 2, 3 and 4.

Based on superior ratings for the first data collection, leaders rated more transformational had higher mean scores on measures of conscientiousness, role modelling, and physical fitness 2, 3, and 4. These leaders also had a lower external locus of control score. For the second administration, the identified group of those higher rated transformational leaders who displayed less laissez-faire style leadership had higher mean scores on prior influence experience, moral reasoning, self-esteem 1, hardiness 1 and physical fitness 3. The pattern for moral reasoning is consistent with earlier findings in the literature. In the VMI context, a great deal of emphasis during the focal cadets' freshman year was placed on using punishment with cadets--both contingent and noncontingent (Atwater, et al. 1994). The shift towards a broader range of leadership styles, including being seen as active and transformational, during their sophomore and junior years may reflect the need for a broader perspective and/or a higher level of moral reasoning being achieved over time by focal cadets, resulting in this significant mean difference.

Table 20

Summary of Significant Mean Differences Between Low Transformational, High Noncontingent Punishment and High Transformational, Low Noncontingent Punishment Focal Leaders for the First and Second Data Collection Periods

Variables	Low Transformational, High Noncontingent Punishment			High Transformational, Low Noncontingent Punishment			Variance Estimate	
	M	SD	N	M	SD	N	T-value	df
Subordinate--First								
SAT Math	544.36	69.84	39	513.33	62.33	33	1.97*	70
Leadership Potential Index	50.85	5.06	41	48.95	3.95	37	1.84*	76
Prior Influence	3.16	.46	31	3.51	.55	28	-2.66**	57
Subordinate--Second								
Hardiness 1	6.67	1.36	25	7.50	.99	28	2.54**	51
Hardiness 3	6.58	1.36	19	7.78	.73	23	-3.65**	40
Self-Esteem 1	3.24	.37	26	3.44	.45	28	-1.79*	51
Self-Monitoring (Perception)	3.69	.58	21	3.32	.49	23	2.26**	42
Physical Fitness 4	212.38	37.10	26	232.00	34.83	29	-2.02*	53
Superior--Second								
Leadership Potential Index	51.44	5.03	18	48.21	4.70	25	2.16*	41
Social Maturity Index	49.58	3.64	18	47.03	2.75	25	2.61**	41
Self-Monitoring (Control)	4.00	.49	13	3.66	.58	18	1.71*	29

*p < .05
**p < .01

Note. The mean cut-offs for low vs. high transformational leadership for subordinate ratings were 2.05 and 2.20 in the first and second data collection periods, respectively. The mean cut-offs for low vs. high transformational leadership for superior ratings were 2.17 and 2.19 in the first and second data collection periods, respectively. The mean cut-off for low vs. high noncontingent punishment for subordinate ratings were 1.72 and 1.49 in the first and second data collection periods. The mean cut-off for low vs. high noncontingent punishment for superior ratings was 1.30 in the second data collection period.

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Table 21

Summary of Significant Mean Differences Between Low Transformational, High Laissez Faire and High Transformational, Low Laissez Faire Groups for the First and Second Data Collection Periods

Variables	Low Transformational, High Laissez-faire			High Transformational, Low Laissez-faire			Variance Estimate	
	M	SD	N	M	SD	N	T-value	df
Subordinate--First								
SAT Math	555.45	72.92	44	529.81	74.82	53	1.70*	95
Sensing	15.29	6.36	47	19.30	7.96	60	-2.81**	105
Hardiness 3	6.84	1.36	39	7.31	1.11	45	-1.72*	82
Self-Monitoring (Control)	3.83	.54	39	3.60	.62	52	1.86*	89
Subordinate--Second								
Hardiness 1	7.02	1.02	37	7.49	1.15	39	-1.85*	74
Hardiness 2	6.82	1.19	36	7.31	1.11	38	-1.82*	72
Hardiness 3	6.74	1.06	28	7.50	.93	27	-2.81**	53
Physical Fitness 2	204.18	29.78	33	216.41	31.98	39	-1.67*	70
Physical Fitness 3	204.41	31.06	34	217.87	32.59	40	-1.81*	72
Physical Fitness 4	205.86	36.11	36	228.83	32.20	37	-2.87**	71
Superior--First								
Conscientiousness	21.14	5.62	39	23.69	4.17	41	-2.32**	78
Locus of Control	9.15	3.81	39	7.76	3.72	41	1.66*	78
Role Model	2.96	1.06	35	3.58	1.35	31	-2.09*	64
Physical Fitness 2	208.53	30.43	36	221.87	27.00	38	-2.00*	72
Physical Fitness 3	204.31	34.43	35	225.62	25.61	40	-3.06**	73
Physical Fitness 4	214.02	35.15	37	231.02	34.38	38	-2.12*	73
Superior--Second								
Prior Influence	3.11	.48	38	3.42	.52	30	-2.51**	66
Moral Reasoning	27.76	11.02	39	32.74	12.09	36	-1.86*	73
Self-Esteem 1	3.22	.38	44	3.43	.37	38	-2.47**	80
Hardiness 1	6.76	1.32	43	7.33	1.29	38	-1.94*	79
Physical Fitness 3	202.69	29.73	39	214.69	34.25	36	-1.62*	73

*p < .05
**p < .01

Note.   The mean cut-offs for low vs. high laissez-faire leadership for subordinate ratings were 1.55 and 1.51 for the first and second data collection periods, respectively. The mean cut-offs for low vs. high laissez-faire leadership for superior ratings were 1.68 and 1.59 for the first and second data collection periods, respectively. The mean cut-offs for low vs. high transformational leadership for subordinate ratings were 2.05 and 2.20 in the first and second data collection periods, respectively. The mean cut-offs for low vs. high transformational leadership for superior ratings were 2.17 and 2.19 in the first and second data collection periods, respectively.

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Subgroup Analyses for Leadership Change Over Time

In addition to the mean difference tests summarized above, in Tables 22 and 23 we summarize patterns of mean differences on the antecedent measures contrasting difference scores on leadership and management style obtained by comparing data collected over the two periods of time. Mean scores presented in Tables 22 and 23 are the original scores for each of two groups on these antecedent measures. The difference between the first data collection period subtracted from the second was used to compute each t-test analysis. Results that achieved marginal significance levels are also included in these tables (e.g., $p \leq .10$).

For each leadership and management style scale the two groups were formed based on differentiating leaders who showed a positive increase in leadership ratings over the two data collection periods, versus those leaders who showed a decrease in their leadership scores. Then, we examined each of these respective group's scores on all antecedent measures collected prior to the collection of leadership ratings in either data collection period one or two. All of the variables were tested for significance, however, we have discussed below only those effects that were significant.

For superior ratings of transformational leadership the only significant difference observed was on self-monitoring (control). Leaders who had increased their ratings on transformational leadership had lower initial self-monitoring (control) scores. A similar pattern for self-monitoring (control) was found in contingent reward leadership. For leaders who increased in active management-by-exception, scores on the Leadership Potential Index, Social Maturity Index, hardiness 1, self-monitoring (control), and physical fitness were each significantly lower than for those leaders who had decreased in active management-by-exception.

Moving to the less active styles, for passive management-by-exception those focal cadets who increased over time had SAT math and self-monitoring (control) mean scores that were higher and lower external locus of control scores, compared to those focal cadet leaders who decreased over time on passive management-by-exception. For laissez-faire style leadership, SAT verbal scores and the feeling scale of the MBTI were each higher for those leaders exhibiting more laissez-faire leadership over time. Similar to the results for passive management-by-exception, the focal cadet leaders who became more inactive in their leadership style over time, were also less externally focused.

Turning to the last set of analyses based on subordinate ratings, those cadets who had higher transformational leadership ratings over time, versus lower, exhibited lower prior influence experience and self-monitoring (perception) scores. Those who scored higher on contingent reward style leadership over time had lower scores on cognitive ability, moral reasoning, self-esteem 2 and self-monitoring (perception).

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Turning to ratings of contingent punishment, scores on hardiness were lower for those who used more contingent punishment at both the first and second administration of the hardiness scale. With noncontingent punishment, those focal cadets who increased in their ratings had higher SAT-math and self-monitoring (perception) scores and lower scores on external locus of control and self-esteem 1.

Those focal cadets who were rated as using more active management-by-exception over time had higher SAT-math scores and hardiness 2, while displaying lower scores on the feeling scale of the MBTI. Scores on passive management-by-exception indicated leaders who showed increases had lower scores on feeling and role modelling, while for self-esteem 2 and conscientiousness, their average scores were higher. Changes in the frequency of observed laissez-faire leadership showed similar mean differences with respect to self-esteem 1. However, the pattern for changes in self-esteem may be due in part to attrition. Again, SAT math was higher for those leaders who displayed inactive leadership more frequently over time, while scores on moral reasoning were lower for those focal cadets. The two hardiness scores were higher for those focal cadet leaders who exhibited more laissez-faire leadership over time.

Finally, for initiation of structure, those who exhibited an increase in ratings had lower mean scores on prior influence experience and self-monitoring (perception), while those cadets who showed increases in consideration over time had lower prior influence and physical fitness 1 scores.

Table 22

Summary of Significant Mean Differences on Antecedent Measures Based on Changes in Leadership--Superior Ratings

Variables	M	SD	N	M	SD	N	T-value	df
	Transformational Scores Decreased Over Time			Transformational Scores Increased Over Time			Variance Estimate	
Self-Monitoring (Control)	3.71	.59	33	3.34	.68	24	2.15**	55
	Contingent Reward Scores Decreased Over Time			Contingent Reward Scores Increased Over Time				
Self-Monitoring (Control)	3.62	.57	23	3.37	.73	24	1.29*	45
	MBEA Scores Decreased Over Time			MBEA Scores Increased Over Time				
Leadership Potential Index	49.92	4.75	37	47.63	4.62	26	1.91**	61
Social Maturity Index	48.72	3.39	37	47.45	2.70	26	1.59*	61
Hardiness 1	7.35	1.15	37	6.81	1.31	24	1.71**	59
Self-Monitoring (Control)	3.63	.63	30	3.34	.65	20	1.59*	48
Physical Fitness 1	195.68	27.41	32	183.79	38.02	24	1.36*	54
	MBEP Scores Decreased Over Time			MBEP Scores Increased Over Time				
SAT Math	511.81	72.27	33	538.88	67.89	27	-1.42*	58
Locus of Control	9.59	4.16	37	7.58	3.18	31	2.21**	66
Self-Monitoring (Control)	3.40	.73	26	3.70	.55	27	-1.67**	51
	Laissez-Faire Decreased Over Time			Laissez-Faire Increased Over Time				
SAT Verbal	453.78	64.99	37	484.61	70.49	26	-1.79**	61
Locus of Control	9.61	3.91	39	7.61	3.72	31	2.17**	68
Feeling	6.07	4.17	39	7.48	4.06	31	-1.42*	68

*$p \leq .10$
**$p \leq .05$

Table 23

Summary of Significant Mean Differences on Antecedent Measures Based on Changes in Leadership--Subordinate Ratings

Variables	M	SD	N	M	SD	N	T-value	df
	Transformational Scores Decreased Over Time			Transformational Scores Increased Over Time			Variance Estimate	
Prior Influence	3.40	.47	34	3.23	.48	46	1.62*	78
Self-Monitoring (Perception)	3.63	.58	34	3.39	.56	46	1.82**	78
	Contingent Reward Scores Decreased Over Time			Contingent Reward Scores Scores Increased Over Time				
SAT Verbal	486.25	60.92	40	453.18	55.93	44	2.59***	82
SAT Math	549.00	68.38	40	523.18	70.47	44	1.70**	82
Moral Development	29.92	10.77	37	24.30	9.61	46	2.51***	81
Self-Esteem 2	3.36	.48	37	3.17	.45	43	2.83**	78
Self-Monitoring (Perception)	3.65	.53	34	3.36	.56	40	2.21**	72
	Contingent Punishment Scores Decreased Over Time			Contingent Punishment Scores Increased Over Time				
Hardiness 1	7.29	1.07	65	6.99	1.46	64	1.30*	127
Hardiness 2	7.22	.90	61	6.70	1.32	59	2.55***	118
	MBEP Decreased Over Time			MBEP Increased Over Time				
Conscientiousness	22.25	4.50	47	23.73	3.83	45	-1.70**	90
Feeling	7.85	4.61	47	6.06	3.76	45	2.03**	90
Role Model	3.61	1.23	35	3.00	.18	39	2.18**	72
Self-Esteem 2	3.19	.52	42	3.36	.38	37	-1.63**	77
	Laissez-Faire Decreased Over Time			Laissez-Faire Increased Over Time				
SAT Math	525.00	67.39	42	548.51	70.74	47	-1.60*	87
Moral Reasoning	29.13	11.93	41	25.14	8.91	48	1.80**	87
Self-Esteem 1	3.26	.39	46	3.39	.38	49	-1.60*	93
Hardiness 1	6.68	1.40	44	7.31	1.06	49	-2.44***	91
Hardiness 2	6.71	1.33	42	7.08	1.09	44	-1.39*	84

Table 23
(continued)

Variables	M	SD	N	M	SD	N	T-value	df
	Noncontingent Punishment Scores Decreased Over Time			Noncontingent Punishment Scores Increased Over Time			Variance Estimate	
SAT Math	533.28	70.28	67	556.93	69.91	49	-1.79**	114
External Locus of Control	9.02	3.77	72	8.05	3.71	57	1.47*	127
Self-Esteem 1	3.40	.39	72	3.29	.35	54	1.56*	124
Self-Monitoring (Perception)	3.45	.59	59	3.63	.59	49	-1.55*	106
	MBEA Decreased Over Time			MBEA Increased Over Time				
SAT Math	546.30	72.55	46	522.05	58.54	39	1.68**	83
Feeling	7.63	4.32	52	5.92	3.97	35	1.97**	92
Hardiness	6.66	1.40	48	7.15	.95	35	-1.80**	81
	Initiation of Structure Decreased Over Time			Initiation of Structure Increased Over Time				
Prior Influence	3.41	.46	49	3.21	.51	59	2.18**	106
Self-Monitoring (Perception)	3.65	.66	49	3.49	.50	59	1.40*	106
	Consideration Decreased			Consideration Increased				
Prior Influence	3.40	.46	44	3.23	.52	65	1.68**	107
Physical Fitness 1	195.88	29.46	50	183.30	36.18	70	2.02**	118

*p < .10
**p < .05
***p < .01

DISCUSSION

The purpose of this report was to examine the relationship between individual characteristics and subsequent evaluations of leadership and management style. We provided a general framework at the outset of this report that delineated a causal model comprised of constructs expected to be predictive of transformational leadership. For comparison purposes we also have included other styles of leadership from the full range of leadership model discussed in Atwater, et al. (1994). The findings contained in this report should be seen as preliminary in that focal cadets included in the current sample are now just emerging into formal leadership roles at VMI. Based on several patterns observed between the first and second data collection periods, we expect that as the focal cadets assume more formal leadership roles at VMI the pattern of relationships between the antecedent and leadership measures should become more aligned with findings reported in prior literature.

The literature review provided the conceptual basis for the inclusion of the various antecedent measures in the current study. Constructs and corresponding measures such as conscientiousness, moral reasoning, prior leadership experience, and hardiness were included because they were expected to positively predict who would emerge as transformational leaders in the sample of focal cadets. The primary focus of the larger longitudinal research study is to determine the factors that result in the emergence of leaders at the highest end of the full range of leadership--including transformational leaders. Yet, in the current report we have also provided results on a number of other leadership and management styles to contrast them with our primary focus on transformational leadership.

As we noted at the beginning of the results section, the mean frequency levels of leadership reported in our results were generally low. This pattern was consistent across the two measurement periods in which management and leadership styles data were collected.

During the first year at VMI, a great deal of effort is placed on levelling the class to the point where they are equivalent members of "the team", or class. In this setting it may be difficult to emerge as a leader given the type of constraints placed on focal cadets in both leader and follower roles. Thus, it is very likely that some of the relationships reported in the current report were attenuated due to a restriction of range on the leadership measures.

A number of findings reported in the results section were supportive of earlier leadership research. For example, there was some evidence that physical fitness predicted transformational and contingent reward style leadership ratings generated by superiors, as well as other active but corrective styles of leadership including active management-by-exception, initiation of structure and contingent punishment. Being physically fit is an important factor in how the institution selects its leaders for top

positions in the class and institution, thus it was not surprising that it accounted for a significant amount of variance in ratings of leadership and management style that were linked to more active styles of leadership. These results partially confirmed earlier findings reported by Rice, et al. (1984) that included a sample of West Point cadets, as well as Atwater and Yammarino (1993) and Yammarino, et al. (1993) with Naval Academy midshipmen.

Results regarding the self-monitoring scales were generally mixed across the different groups of raters. For subordinate ratings, the self-monitoring (control) scale exhibited a negative relationship with contingent reward leadership. Focal cadets rated as more transformational by their subordinates, and who were evaluated as using noncontingent punishment less often, had higher scores on the self-monitoring (control) measure than focal cadets rated as less transformational. This pattern may indicate that those focal cadets who attempted to manipulate or control their behavior based on cues from others, were seen as displaying less of an inner direction or standard for their behavior. Some support for this position comes from results presented in Table 21. Specifically, those leaders evaluated as less transformational and more laissez-faire had lower scores on self-monitoring (control). Similarly, those leaders whose ratings on transformational leadership increased over time had lower self-monitoring (control) scores (See Table 22).

Correlational results regarding Rotter's measure of locus of control for superior ratings of transformational leadership were in the predicted direction, but not significant. Specifically, external locus of control was negatively correlated with superior ratings of transformational leadership, while being positively associated with passive management-by-exception and laissez-faire style leadership. However, these relationships were not significant, and focal cadets' locus of control scores were not consistently correlated with the leadership measures collected from subordinate raters. Again, given the context of the current study, and the fact that many focal cadet leaders reported through interviews and self-kept journals of observed leadership behaviors, that they had experienced a great deal of noncontingent punishment style leadership, it should not be too surprising that locus of control did not significantly correlate with most measures of active, consistent leadership.

Included among the more surprising and unexpected findings were the negative correlations between the two measures of cognitive ability and ratings of transformational leadership. These findings contradict results reviewed by Lord, et al. (1986), who reported a .50 aggregate correlation between intelligence and leadership. One possible explanation for this discrepancy comes from the work of Fiedler (1993) on cognitive resource theory. Fiedler argued that more intelligent leaders, particularly those with less experience, tend to perform more poorly under high stress. Fiedler reported preliminary empirical results with Coast guard personnel to support his position. In the current setting, the focal cadet leaders were not only inexperienced,

but were also under a tremendous amount of stress. The net result may be the type of inverse relationship suggested by Fiedler (1993).

Along these same lines of argument, Bass (1992) described the VMI culture as being one of "high contrasts". Specifically, while the VMI culture can be inspirational and elevating, it also can place a tremendous amount of pressure on cadets to perform. This is particularly true in the first two years at VMI, and may partially explain the negative relationships observed with cognitive ability. Cadets who are more academically oriented may initially show a diminished interest to become involved in cadet leadership activities during their first years at the institute when contingent and non-contingent punishment often predominate.

Another alternative explanation for these findings is that the measures used to assess cognitive ability may not be specific enough to get at the types of problem-solving skills needed to be successful in the VMI context. To the extent that the SAT scores do not tap into the focal cadet's ability to detect emerging problems, they may not provide the type of positive relationship that has been found with other measures of intelligence (see Lord & Hall, 1992).

One of the more interesting findings concerned the pattern of relationships between leadership and the multiple measures of hardiness used in the current study. Results indicated that those leaders who saw themselves as more able to handle challenging situations were in turn seen by subordinates as more transformational, as well as being rated higher on contingent punishment and contingent reward styles of leadership. Although not previously tested, the profile of a leader who is more able to physically and mentally handle high levels of stress is rather consistent with the profiles depicted in the literature on inspirational/charismatic leaders, and supports qualitative descriptions provided by Bass (1985) of various transformational leaders. Indeed, it would seem highly worthwhile to spend time developing a better handle on the hardiness construct and how it relates to the emergence of focal cadet leaders in contexts where stress levels are extremely high.

Two new biodata measures developed based on the work of Mumford, et al. (1993) and Avolio and Gibbons (1988) were tested in the current study. These measures represented distal indicators of future leadership performance. Results concerning the role modelling measure were mixed, often producing nonsignificant effects. The prior influence experience measure showed some promise in terms of predicting both superior ratings of contingent punishment, passive management-by-exception, laissez-faire and transformational leadership for the second data collection. For example, the number of prior leadership experiences positively predicted superior ratings of transformational leadership, and was negatively correlated with the more inactive forms of leadership, such as passive management-by-exception and laissez-faire leadership. These preliminary results suggest that a more in-depth analysis of the impact of prior life experiences on leadership emergence is clearly warranted. This

is consistent with recommendations by Mumford, et al. (1993), as well as Avolio and Gibbons (1988), to take a closer look at leadership development using a life-span perspective. A life-span perspective would provide opportunities for early intervention into leadership development, as well as for identifying those characteristics that could be used to predict the future emergence of leaders.

Generally, results of the hierarchical regression and LISREL analyses demonstrated that the variables included in the overall model did show some promise in terms of predicting future leadership behavior and potential. Yet, in the first data collection period, the results for both subordinate and superior ratings were rather weak as compared to ratings collected in the second data collection period.

There were two potential problems that may have had a significant impact on the pattern of results observed in the current study. The first problem relates to the high levels of multicollinearity across many of the antecedent measures. Unfortunately, in our attempt to include a more comprehensive set of antecedent measures, we included measures that were typically correlated with each other, as well as the leadership variables. The intercorrelations among the antecedent measures made it difficult to derive an optimal fit for either the hierarchical regression and/or LISREL causal models. The other problem noted earlier pertains to the potentially dynamic nature of the criterion measures. Specifically, a more accurate test of the causal model included in the current study will eventually take place when the leadership ratings are based on focal cadets who have had experience serving in formal leadership roles.

Nevertheless, the amount of variance accounted for in the leadership ratings and the fit indices for the separate causal models showed some support for including these antecedent measures in future research on a full range of leadership styles. As we noted in the introduction, there have been relatively few leadership studies that have attempted to examine leadership emergence using a longitudinal framework that simultaneously tests measures with proven construct validity for predicting leadership behavior.

In line with our a priori expectations, focal cadets who were rated by subordinates as more transformational, while also exhibiting less laissez-faire leadership, had significantly higher scores on initial measures of hardiness, physical fitness and self-esteem. Also consistent with earlier research, for superior ratings from the first data collection period, focal cadets rated higher on transformational leadership and lower on laissez-faire, had higher scores on conscientiousness, role modelling, and physical fitness, and scored lower on external locus of control.

Finally, the preliminary results pertaining to the changes in scores on transformational leadership only resulted in one significant effect on self-monitoring (control). Those focal cadets whose ratings increased on transformational leadership

had lower self-monitoring (control) scores. However, some of the differences observed with other leadership measures were consistent with results discussed earlier. For example, those focal cadet leaders who were rated higher over time on active management-by-exception had lower scores on the feeling scale of the MBTI, while for passive management-by-exception, they had lower scores on feeling and role modelling.

The current report provides ample evidence to support the collection of additional leadership data on the focal cadets at VMI. Although not always significant, many of the antecedent measures were correlated in the appropriate direction with ratings of leadership and management style. Also, these measures did account for upwards of 25% of the variance in leadership ratings in several of the models that were tested. Therefore, the collection of additional leadership data with cadets operating in formal leadership roles would be the next logical step in determining who will emerge as the transformational leaders.

Similar to prior leadership research, the magnitude of relationships between individual characteristics of leaders and ratings of leadership were generally modest and varied as a consequence of the source of ratings. Consistent with results reported by Atwater, et al. (1994), there were some differences in the obtained results depending on the source of leadership ratings. Yet, some of the overall patterns presented in the LISREL causal model were consistent across rater groups, as well as two data collection periods.

Since the current study has a longitudinal focus on the development of leaders, as the focal cadets emerge as cadet leaders, we would expect some of the relationships noted in the current report to vary over time. Indeed, the early indicators of leadership ratings may be less effective in predicting styles of leadership that will emerge at a later point in the focal cadet's career at VMI. For example, the leadership roles assumed by focal cadets in their sophomore and junior years may be more simplistic than in their senior year. Thus, the measures that would predict leadership among seniors may differ from those in earlier years. This may suggest that we should focus more effort on predicting the evolution and/or transition to higher levels of leadership than the absolute scores within each time period.

It is clear from our results, that we will need to reduce the number of measures used to assess leadership emergence given the small n-sizes. The results provided in this report should facilitate the choice of measures to be used in future assessments of the focal cadet leaders in our sample.

A second strategy for maximizing our degrees of freedom is to set up a repeated measures design in future work. As we collect additional data on each of these focal cadets, we can use such designs to track their emergence as leaders over time.

Finally, distinguishing focal cadets who were rated more transformational versus those who were not resulted in a number of interesting findings that were often consistent with prior literature. This pattern of results leads to a recommendation to focus on a smaller subsample of focal cadet leaders for more intense study. Given the amount of data now available on these focal cadets, we should be able to easily identify those who are seen as more transformational, and to conduct a more in-depth analysis of their development prior to and following their entry into VMI.

IMPLICATIONS

Similar to prior leadership research, the magnitude of relationships between individual characteristics of leaders and ratings of leadership were generally modest and varied as a consequence of the source of ratings. Consistent with results reported by Atwater, et al., (1994), there were some differences in the obtained results depending on the source of leadership ratings. Yet, some of the overall patterns presented in the LISREL causal model were consistent across rater groups, as well as two data collection periods. Yet, it would be worthwhile for future leadership research to concentrate on determining the root cause of differences between rater groups perceptions of the same target leader. Explaining such differences clearly has relevance to the increasing use of 360 degree feedback processes. Specifically, if we provide target leaders with feedback from multiple sources that are discrepant, it is our responsibility to at least explain the reason for those discrepancies. To date, there has not been substantial attention in the literature to explain differences in leadership ratings based on the source of the ratings.

If we concentrate on the second set of leadership ratings, (when the focal leaders were no longer freshmen, and the leaders were not so directly involved in managing the freshmen) a number of individual characteristics consistently predicted leadership across sources. In general, lower levels of cognitive ability, more hardiness, better physical fitness, and lower self-monitoring appeared as the best overall predictors of transformational leadership. The fact that low cognitive ability predicted leadership suggests the high stress environment for cadets at VMI may be creating a situation where experience is more important than intelligence for leader success. This conclusion is supported by the relationship found between prior influence (the leader had prior leadership experiences) and their transformational leadership ratings. These findings suggest that early leadership experiences may contribute positively to leader development when the leader is required to operate under stress.

The relationships observed between hardiness, physical fitness and leadership also have implications for training. VMI, as well as many other military training situations, concentrate on physical fitness as a critical component of the training experience. However, training in hardiness (attitudes that promote stress tolerance)

also could be more systematically included to help give leaders the tools they need to become more transformational. Sufficient prior literature exists to support the notion that transformational leaders are more persistent toward achieving their goals (Avolio & Bass, 1988). Consequently, understanding the linkage between hardiness and a transformational leadership has implications for developing and selecting leaders most likely to stick to their goals.

The findings from this study also suggest that predictors of leader behavior vary over time. This has implications for cross-sectional research attempting to understand how individual characteristics affect leader behavior. The stage of development, as well as the particular roles in which the leader is engaging, may influence which predictors are most important. Consequently, these factors must be considered when assessing predictors of leader behavior.

Since the current study has a longitudinal focus on the development of leaders, as the focal cadets emerge as cadet leaders we would expect some of the relationships noted in the current report to vary over time. Indeed, the early indicators of leadership ratings may be less effective in predicting styles of leadership that will emerge at a later point in the focal cadet's career at VMI. For example, the leadership roles assumed by focal cadets in their sophomore and junior years may be more simplistic than in their senior year. Thus, the measures that would predict leadership among seniors may differ from those in earlier years. This suggests that perhaps we should focus more effort on predicting the evolution and/or transition to higher levels of leadership than the absolute scores within a particular time period.

Finally, although not always significant, many of the antecedent measures were correlated in the appropriate direction with ratings of leadership and management style. Also, these measures did account for upwards of 25% of the variance in leadership ratings in several of the models that were tested. Therefore, future research will need to collect additional leadership data with target leaders operating in more formal leadership roles to best determine who will emerge as the transformational leaders. Since there have been very few longitudinal studies of leadership, the current study sheds some light on not only the predictors of leadership, but also some of the constraints and problems associated with longitudinal research. Indeed, the current research breaks new ground in identifying a broad range of potential predictors of a full range of leadership behaviors, while pointing towards areas where the methods and data collection strategies can be improved.

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